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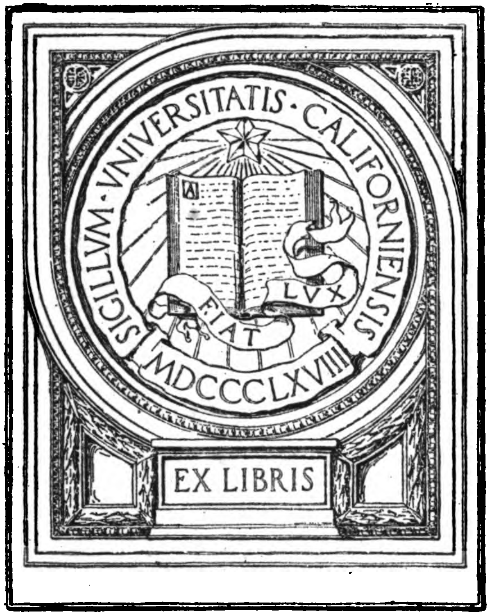

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THE AMERICAN JOURNAL OF PHARMACY.

APRIL, 1847.

ART I.—A REVIEW OF CERTAIN DOCTRINES ADVANCED BY THE CELEBRATED LIEBIG, AND SANCTIONED BY GREGORY AND KANE.* By Robert Hare, M. D., Professor of Chemistry in the University of Pennsylvania.

The means by which the various ferments respectively, produce their appropriate changes, are involved in the greatest obscurity. Some important additions have been made to our knowledge, as respects the facts. The ferments have all been shown to be vegeto-animal matter in a state susceptible of oxidizement, and an analogy has been inferred between their influence and that of some other agents, supposed to act by what has been called catalysis, which is a new name given by Berzelius, to an old mystery. It has long been known that there are two modes by which chemical changes are to be excited. In one of these, the presentation of one or two extraneous elements causes decomposition and recomposition, by the reactions between the elements so presented and those subjected to alteration, as in the various cases of elective affinity: in the other mode, substances are made to re-arrange their constituents into one or more new combinations, by the presence of other bodies with which they do not combine, and which, in some cases, undergo no change themselves. It is to the last mentioned mode of reaction that the name above mentioned has been applied. Yet, under this head, processes have been associated which have irreconcilable features.

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* See "Traité," "Introduction," p. xii. See also Kane's Elements, p. 31. Gregory's Outlines of Organic Chemistry.

Thus to the following processes one rationale is given by the distinguished chemist of Giessen: *the solubility acquired by platina by being alloyed with silver—the catalyzing influence of platina sponge or platina black—the explosion of fulminating powders by slight causes—the reciprocal decomposition of bioxide of hydrogen and oxide of silver—the agency of nitric oxide in the generation of sulphuric acid—the action of ferments.**

To me it seems that there is a great diversity in the characteristics of the processes thus alluded to. In that of the alloy there is at least as many atoms of silver in actual combination with platina, as there are atoms of this metal; and the change which the latter undergoes is precisely the same as that to which the former is subjected.

In the case of platina sponge causing the formation of water; or of platina black causing the acetification of alcoholic vapour, the inducing agent undergoes no change itself nor does it enter into chemical combination either with the materials or the products. Liebig ascribes the result in this instance, to the alternate absorption and subsequent evolution of oxygen by the powder; since, after exposure to the gas, it may; by exhaustion, be made to give up a portion. Yet the agency of this metallic mass cannot differ, in this case, from that in which it causes the pure elements of water to combine, and in which, if absorption take place, it is not confined to oxygen more than to hydrogen. Again the fact established by Faraday, that hydrogen and oxygen may be made to unite by a well cleaned plate of platina, seems irreconcilable with the idea that *absorption* is the mean of its accomplishment. But if absorption be not the cause in the case of the plate, is it consistent to suppose it to be the cause in that of the sponge? In this, as in most other cases, Liebig seems to overlook the all-important agency of electricity in the phenomena of nature. I should infer, that the metal most probably acts by altering the electrical polarity, and consequent association of imponderable with ponderable matter.

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* Traité de chimie organique, Paris, 1840.
Page xix., last paragraph.
" xxvii., Du ferment, paragraph 2d.
" xxxviii. Acétification, paragraph 2d.
" 388-9, Acid acetique.

Having inconsistently assumed that during the dehydrogenation of alcohol by atmospheric oxygen in the presence of platina black, this powder is alternately endowed with the power to take it from the air, and to impart it to that, of which the attraction for oxygen, under the circumstances, is too feeble to take it from the same source, this popular theorist proceeds to make the inference that honey, mother of vinegar, and other substances promotive of acetification, act in the same way by absorbing oxygen from the air, and abandoning it to hydrogen. But if, agreeably to the view above presented, platina black does not act by absorption, no argument, founded on the agency of that substance, will justify the idea that absorption avails in other cases; and it should be recollected that platina black is most active when most free from moisture; while honey, yeast, mother of vinegar, and other substances which cause acetification, have no attraction for oxygen in the absence of water: moreover, that the necessity for moisture to the preparatory oxidizement of gluten, caseine, diastase, and other organic substances, which, by exposure in a humid state, acquire their capacity to act as ferments, is not explained. That water acts as a catalyzer, seems to have escaped notice. Before referring to the absorption of oxygen by honey, as a ground of explanation founded on the analogy of platina sponge, should not an explanation have been given by the ability of water in the one case to prevent, in the other to promote absorption of oxygen.

An electric spark, or any ignited body, a wire made incandescent by a galvanic discharge, has an influence analogous to platina sponge, of which the minutest particle is sufficient to cause ignition throughout an inflammable mixture, however large. There is, in this respect, an analogy between the explosion of inflammable, gaseous mixtures, and those of gunpowder, and of other fulminating powders, of which some, as it is well known, detonate by percussion or friction, or any cause adequate to derange the equilibrium of their particles. In the cases last mentioned, the *change* produced is the same, whatever may be the exciting cause, and the minutest portion of the congeries being made to undergo the change, is of itself competent to produce a like result as respects the whole.

Evidently the property which bioxide of hydrogen, and the oxide of silver, or bioxide of lead, have, of undergoing an explosive deoxidizement in consequence of mere superficial contact, is in some respects peculiar, since the reaction is reciprocal. In the solution of the alloy of platina with silver, one body induces another to undergo the oxidizement to which it is itself subjected. In the case of the bioxide of hydrogen and oxide of silver, two bodies, both prone to *de*-oxidizement, reciprocally induce that species of change. Besides, in this phenomenon, there is no third body to perform a part analogous to that of the nitric acid. From both of the two last mentioned instances, that of platina sponge differs, inasmuch as it undergoes no change, during its catalytic agency.

Not only have ferments power to produce *a* change, but also severally to produce *the* particular change by which either sugar, alcohol, acetic or lactic acid, &c., &c., is respectively generated. Moreover, these bodies are themselves meanwhile undergoing an oxidation or decomposition which is necessary to their power; but the change thus arising in them, is not like that which they induce. Hence, obviously, they operate differently either from the platina sponge or platina black, or from silver in the alloy formed by it with platina.

Liebig conceives that this increased solubility of platina by union with silver, is at war with electro-chemical principles; agreeably to which, any metal in contact with another metal, relatively electro-positive, becomes less susceptible of attack. But agreeably to the principles thus cited, this insusceptibility does not arise in one of two heterogeneous metals in chemical combination with each other, but in one of two such metals either in contact merely, or only communicating through a metallic conductor.

I am surprised that Liebig should find the mystery of catalysis lessened by the solubility of the alloy of platina with silver, when it must be evident that if the oxidation of an atom of a comparatively electro-positive metal, were a sufficient reason why an electro-negative metal, combined with it, should be oxidized, an alloy of gold with silver ought to be soluble; whereas it is known that the common process of parting, is founded on the utter insolubility of gold when so alloyed.

Liebig alleges that there can be no doubt that the acetification of alcohol is of the same order, as the reaction by which the bioxide of nitrogen provokes the formation of sulphuric acid in the leaden chamber; in which process the oxygen of the air is transferred to sulphurous acid by the intervention of that bioxide; since, in like manner, organic substances, associated with spirit of wine, absorb oxygen, and bring it into a particular state which enables two atoms of this element, to replace two atoms of hydrogen, simultaneously oxidized and removed.

But in the case thus cited, for every equivalent of acid formed, an equivalent of the bioxide combines first with an equivalent of oxygen, (perhaps with two,) and in the next place with an equivalent of the sulphurous acid, forming a compound which is decomposed by water into sulphuric acid, and the regenerated bioxide. There appears to me to be no analogy between this process, and that of the influence of matter existing in no equivalent proportion, and which cannot be shown to form a definite chemical compound, either with acetyl or hydrogen.* It is not represented that in the vinous fermentation, any union, either transient or permanent, takes place between the elements of the sugar and those of the ferment; on the contrary it is alleged that the oxidation and precipitation of the yeast takes place independently, though it proceeds, *pari passu*, with the alcoholification.

As to all the processes referred to for illustration, as well as those of fermentation which they are alleged to resemble, it appears to me that Liebig and his disciples have been too sanguine of their capacity to give adequate elucidation.

Respecting changes of the kind above described as *catalytic*, Dr. Kane uses the following language :—" *The elements of a compound are retained together in certain molecular arrangement, because the affinities are there satisfied; but it is natural to suppose that whilst the elements remain the same, their affinities for each other might be just as completely satisfied by a different molecular arrangement.*" This language might be held more reasonably, were this variation in arrangement accompanied by no concomitant acquisition of chemical properties; but is it reasonable to consider the difference between sugar, and the alcohol and carbonic acid into which it is resolvable, as arising merely from molecular arrangement? Can the active influence of alcohol upon the animal nerves be due merely to the situations occupied by its three ultimate ponderable elements, carbon, hydrogen, oxygen, relatively to each other? Admitting that the union of oxygen with the ingredients of gluten could, by imparting any consequent mechanical impulses, cause the hydrogen and oxygen of an atom of water to unite with the elements of sugar, and to separate into alcohol and carbonic acid, as above mentioned, how can that movement, or the consequent rearrangement of the ponderable particles, explain the acquisition of new properties, of which the combining atoms, or the compounds previously containing them, were destitute? Liebig infers, that a body in the act of decomposition or combination, may communicate a movement to the atoms of an adjoining compound, so that gluten in the state of oxidation, in which it is called yeast, induces sugar, $C^{12} H^{11} O^{11}$, existing in the same liquid, to unite with the elements of water, making $C^{12} H^{12} O^{12}$, and consequently to be resolvable into four equivalents of carbonic acid and two of alcohol.

---

* The reader is presumed to know that agreeably to Liebig, alcohol, $C_4 H_5 O+HO$ the hydrated protoxide of ethyl, is converted into acetic acid, the hydrated *tri*-oxide of acetyl, $C_4 H_3 O_3+HO$, by the substitution of two atoms of oxygen for two of hydrogen. By these means it is inferred that the alcoholic base, the protoxide of ethyl, $C_4 H_5 O$ is converted into the trioxide of acetyl, $C_4 H_3 O_3$, an atom of water being present in the one no less than in the other.

Adopting the same views as Liebig, Dr. Kane alleges, "that the slow decomposition of diastase communicates to the molecules of many thousand times its weight of starch, the degree of motion necessary for their rearrangement, and the appropriation of the elements of water requisite for the formation of starch sugar."

It is perfectly evident that the particles of the catalyzed substance are in some way so affected by the catalyzing body, as to be put into a state of reaction, which had not otherwise ensued; but that this is accomplished merely by imparted motion, appears to me to be a surmise destitute of plausibility. The fact that the weight of the diastase requisite to saccharify starch is so very small, as is alleged by Dr. Kane, evidently renders it extremely improbable that it acts by creating any mechanical disturbance. Yet this respectable chemist is so completely carried away by this idea, that he proceeds to make the following remark: "*This law, of which the simplest expression is that were two chemical substances are in contact any motion occurring among the particles of the one, may be communicated to the other, is of a more purely mechanical nature than any other principle yet received in chemistry, and, when more definitely established by succeeding researches, may be the basis of a dynamic theory in chemistry, as the law of equivalents and multiple combination expresses the statical condition of bodies which unite by chemical force.*"

I perfectly agree in opinion with the author of these suggestions, as to the *purity of the mechanical attributes of the principle on which they are founded,* but cannot on this very account deem them competent to explain the chemical phenomena on which he conceives them to bear.

As the mechanical influence of the motion of bodies is as the weight multiplied by the velocity, is it conceivable that any movement in the particles of one part, by weight, of diastase, can be productive of analogous movements in two thousand parts of starch?

The idea that yeast might owe its power to animalcules, suggested itself to me more than thirty years ago, and seems to have some support from the fact, that fermentation only thrives within the range of temperature compatible with animal life. Latterly, its activity has been ascribed by some observers to the agency of extremely minute vegetables. Kane, while admitting the existence in yeast of "*a vast number of globular bodies, possibly animalcules,*" treats the idea as untenable, because the weight of the alcohol and carbonic acid is greater than that of the sugar employed. But if the union of water with the elements of the sugar can add to the weight of the products *without* the assistance of animalcules, wherefore should *their agency* be inconsistent with an augmentation from the same source? It seems to be overlooked that there has been much reason to infer, that the conversion of cane sugar into grape sugar (glucose) is of necessity precursory to the vinous fermentation, wherever the saccharine matter is not naturally in that state. But when grape sugar is fermented, the disparity between the weight of the sugar and its products no longer exists; the weight of the resulting alcohol and carbonic acid, are just equal to that of the sugar out of which they are generated.

Independently of any agency of this kind, which seems even more probable in the case of some species of infection than in that of fermentation, I conceive that the present state of our knowledge does not allow of our comprehending the means by which bodies, whether organic or inorganic, are endowed with the powers ascribed to catalysis; but that we have great reason to believe that these powers, as well as all the properties which ultimate elements acquire by diversity of association, as in compound radicals, are due to the same source as the phenomena of galvanic electricity.

It is well known, that although pure zinc is not susceptible of oxidation by exposure to dilute sulphuric acid, yet that, when containing minute proportions of other metals, as in the case of commercial zinc, it becomes liable to rapid oxidation by the same reagent. This Faraday has explained by the electro-chemical influence of the comparatively electro-negative metallic particles distributed throughout the mass of the zinc, which he conceived to be productive of as many local galvanic circuits with corresponding electrolytic currents. This explanation has, I believe, been universally sanctioned, and was consistent with the previous discovery of Sturgeon, that when, by amalgamating the surface with mercury, a metallic communication was made between the electro-positive and electro-negative particles, so as to prevent the formation of electrolytic currents through the oxidizing liquid, the zinc became nearly as insusceptible of union with oxygen, as when in a pure state.

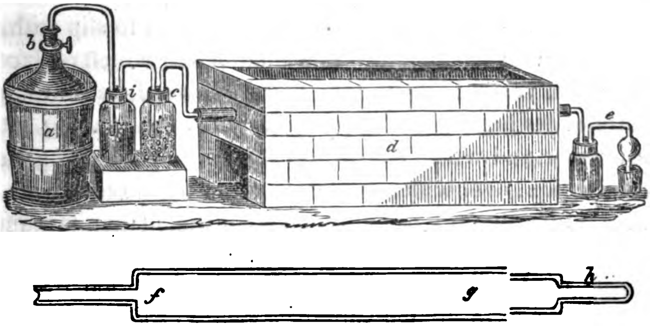
Nevertheless, either when pure, or when amalgamated, the zinc was found oxidizable by diluted sulphuric acid, provided it were made the element of a galvanic pair.

The facts above mentioned, having been recalled to the attention of the scientific reader, I beg leave to inquire whether the electrolytic influence thus ascribed by Faraday to the metallic particles, has not a greater analogy with that of a ferment, than those which have been brought forward by Liebig, Kane, and others, with a view to explain the influence of that class of agents upon mechanico-chemical principles? Wherefore, may not the distribution of a nitrogenized substance, throughout a mass of inorganic matter, operate as do the metallic impurities in commercial zinc? The existence of a powerful voltaic series in the gymnotus and other electrical fishes shows that the proximate elements of animal matter, are, when duly associated, as capable as metals of forming the elements not only of simple, but of complex galvanic circuits.

The efficacy of water in exciting fermentation may be referred to its ability to promote electrolysis, and until we are enabled thoroughly to understand the part which it performs in this process, we shall vainly attempt to explain that species of catalysis to which the presence of moisture is indispensable.

ART. II.—REMARKS ON THE REDUCTION OF IRON BY HYDROGEN.

BY WILLIAM PROCTER, JR.



a, *b*, a self-regulating reservoir for generating hydrogen.
i c, arrangement for washing and drying the gas.
d, furnace with reduction tube enclosed.
f g, sectional view of the reduction tube.

As there has been an increased demand for "*prepared iron*," or iron reduced by hydrogen, which has chiefly been supplied from abroad at a high price, it has been thought that the publication of a few practical remarks on the apparatus and process, based on a repetition of the operation many times during the past year, will be attended with advantage, notwithstanding that a valuable paper on the same subject by M. M. Soubeiran and Dublanc was transferred from the *Journal de Pharmacie* to the 17th volume of this work.

It need hardly be stated that the "prepared iron" of pharmacy is metallic iron in that minute state of division which it presents when its oxide at a red heat has been deoxidized by a current of hydrogen gas. The elements of the process of manufacture, therefore, consist of means for generating and purifying hydrogen gas, and for containing and heating the oxide of iron during the passage of the gas and in contact with its particles.

1st. Instead of the flask used by the chemists above-named, and which cannot be well regulated, I have used a self-regulating gasometer, *a b*, which has several advantages. Though best made of lead, yet for practical purposes it may be constructed of two kegs, one small enough to slip within the other, with tight joints. The smaller keg which replaces the leaden vessel *b* has its open end downward, and into the centre of its head a gas stop-cock is screwed, opening into its interior, and which constitutes the exit for the gas generated within, over which control is given by the cock. As a much larger quantity of hydrogen is consumed than is requisite to combine with the oxygen of the oxide, the amount of zinc used is proportionally great. The solution of two pounds of zinc in diluted sulphuric acid will yield about as much hydrogen as is requisite to deoxidize the same weight of sub-carbonate of iron, but in practice three or four times this amount will be required, as especially towards the last of the process a large amount of gas passes unused. About 6 lbs. of zinc scraps and 8 lbs. of oil of vitriol diluted with six times its bulk of water, are the proportions best adapted for decomposing two pounds of the sub-carbonate of iron.

2d. The jars *i*, *c*, which should be of three or four quarts capacity, contain water and lime; *i* is half-filled with water, and is connected with the stop-cock of the gas generator by a leaden tube which dips below the surface of the water. Another tube connects *i* with the jar *c* filled three-fourths full of fragments of unslaked lime, and reaches nearly to its bottom. A third tube connects *c* with the end of the reduction tube which passes through the furnace *d*, and a section of which is represented at *f*, *g*, *h*.

3d. The reduction tube that I have employed is made of wrought iron, is thirty inches long and four in diameter. One end is open, the other closed, with the exception of an orifice of one inch in diameter into which an iron tube 12 inches long is firmly screwed. The open end of the tube is closed by the hollow iron stopper *h*.

4th. The furnace consists of an oblong enclosure of bricks without mortar. After the first two layers a number of iron rods are placed transversely to support the fire, then two or three layers on this making the interior 9 inches wide, 36 inches long, and 6 inches deep to the grating.

5th. The arrangement *e* consists of a common half-gallon glass jar connected with the reduction tube on one side, and from the other a bent tube issues with a bulb near the extremity, the open end dipping in water. Having prepared the apparatus, the next step is to choose the form of of oxide of iron to be treated. MM. Soubeiran and Dublanc employed the anhydrous sesquioxide, and the suboxide obtained by calcining the oxalate. I have used the sub-carbonate of iron (precipitated carbonate) of the shops with perfect success, and this is the form most readily attainable. It should be absolutely free from saline matter, as sulphate of soda or potassa, because these salts are de-oxidized by hydrogen, and sulphurets of potassium and sodium formed, which even in minute quantity give a sulphurous taste to the iron as well as attract moisture.

Having the apparatus and oxide ready, a very important step consists in introducing the latter into the reduction tube in such a manner that it will expose a very large surface to the action of the gas. Soubeiran and Dublanc used a succession of flat shelves of wire gauze kept apart by small iron bars. This is inconvenient because of the small diameter and great length of the tube. A better plan is to provide pieces of wire gauze seven-eighths of the length of the tube, and from three to six inches wide, bent in a semi-cylindrical shape. The widest is then covered with a layer of sub-carbonate about a quarter of an inch thick; on this another gauze is placed, and likewise covered with the sub-carbonate, and gauze after gauze with iron intervening is thus built up until the pile assumes a size almost equal to the capacity of the tube; a gauze is then placed over the top—a few turns of annealed wire drawn around the whole, and the mass slipped carefully into the tube until it approaches within half an inch of the opposite end.

The iron stopper *h* is now covered externally with a soft lute composed of fine clay, lime and white of egg, and water, and inserted into its place about a line beyond the edge of the tube, and a few tacks driven between the stopper and tube to render it immovable; the whole end is then carefully luted and dried; as the luting cracks by drying, it is best to cover it finally with a mixture of clay and lime and water, with one-twentieth of borax, which forms a fusible coating. I have been thus minute in reference to the luting because of the inconvenience first experienced by the hydrogen issuing from the joint whilst in the fire, to the cessation of its escape at the terminal point of the apparatus thus depriving the operator of the only means of judging of the progress of the reduction.

The filled tube is now inserted in the furnace, its respective ends connected with the other apparatus, the joints well cemented with the lute before described, and all is ready to proceed:—the stopcock of the gasometer is opened, and the gas suffered to flow through the apparatus until all the air is displaced, the fire is then built around the tube with charcoal and anthracite, and as soon as the tube arrives at a dull red heat the gas is allowed to flow in rapidly. The success of the operation depends on the regulation of the heat more than on any other feature in it. If too little, the deoxidation is not accomplished; if too great, as a bright cherry red heat, the particles are conglomerated or welded together, and the quality of the product injured. A dull red heat, regularly kept up throughout the whole length of the tube is the best criterion to govern the operator.

The half-gallon jar in the terminal arrangement should be well refrigerated, which condenses the aqueous vapour and permits only the excess of hydrogen to escape, and the relative volume of the gas bubbles passing through the water in the washing jar, and that at the terminal tube, will give the best index of the consumption of the gas. Besides, the amount of water condensed is also a means of judging. Assuming the sub-carbonate of the Pharmacopœia to be in a hydrated condition, about 14 oz. of water should be evolved from 32 oz. of the sub-carbonate. When the latter quantity of material is operated on, the process is occupied from 5 to 8 hours. The current of gas should be kept up after the removal of the fire until the apparatus cools to the ordinary temperature, but in small quantity. This is necessary to exclude the air, because the reduced iron if exposed to the atmosphere whilst hot instantly takes fire and is converted into sesquioxide.

When cool, the stopper and luting is carefully removed, and the gauze drawn out on to a sheet of paper. What was a solid mass at first is now a series of pieces of wire gauze covered with the iron in pulverulent slightly cohering masses of an iron grey colour and occupying about one-eighth of the former space. The pieces of gauze are carefully separated and examined. If any part of the iron is black instead of *iron grey*, it must be separated from the rest, as it is not fully deoxidized, and is very insoluble in diluted sulphuric acid. When the iron is perfectly reduced and pulverulent, it effervesces like a carbonate when thrown into dilute acids; this, together with its light colour, and freedom from taste, are the best criteria for judging of its quality. When a small mass is struck with a smooth hammer on an anvil, it is compressed into a scale with a brilliant metallic lustre.

Some are impressed with the idea that this operation is attended with much danger, which is not true if the directions above given are followed. On two occasions I have had explosions resulting in the entire destruction of the jar containing lime, but this was before I was aware of the necessity of using so large an amount of zinc. In renewing

the latter in the gasometer, notwithstanding the precaution was taken to close the orifice of the tube *i*, and subsequently to expel the air from the gasometer before attaching it to the washing bottle, yet sufficient air had made its way in to cause an explosive mixture when the current of hydrogen was re-established.

ART. III.—NOTE ON CUCUMBER OINTMENT.

By William Procter, Jr.

An ointment prepared from the juice of the common cucumber, has long been known in French pharmacy, and has recently been introduced into this city by our colleague Elias Durand, who has prepared it for several years past. It is employed as an emollient application, and when well made is a good preparation in all cases where the ung. aq. rosæ, is used, and an emollient ointment wanted.

The process of making cucumber ointment consists of three distinct operations: 1st, the extraction of the juice of the green fruit in the state of advancement that it is usually eaten; 2d, the preparation of a simple ointment; 3d, the impregnation of this ointment with the odorous principle of the juice.

Seven pounds of cucumbers are pared and rasped, or sliced and bruised, and the juice expressed from them in any convenient manner so as to exhaust the pulp, and the juice strained through muslin, or a fine seive.

Twenty-four ounces of the purest lard, and fifteen ounces of selected veal suet cut in pieces, are fused together in a suitable vessel by means of a water bath heat; a little rose water (4 oz.) is added and agitated with the melted fat, and the whole thrown on a muslin cloth, allowed to pass without pressure, and suffered to repose till cool, that the moisture may separate. The ointment thus prepared is placed in a deep wide-mouthed earthen vessel, so arranged as to keep the ointment in a soft semi-fluid consistence, and one third of the juice added and beaten with the ointment until the fats of the latter have extracted all or nearly all the odour from the liquid, which requires several hours. It is then allowed to stand until the fluid separates that it may be decanted, and another third of the juice added. This is beaten in like manner until exhausted, then decanted, and finally the last third added and similarly treated.

The ointment is now heated by means of a water bath for an hour in a close vessel, allowed to repose for 25 minutes, that the coagulated albumen of the juice may rise to the surface and be removed with a skimmer. The clear melted ointment is then carefully ladled out, so as not to disturb the sediment, and strained into glass or close-textured stone jars of moderate capacity and closely stopped.

This is the proper form to prepare it for long keeping, but before using it, a quantity to suit the demand of a month is placed on a warm mortar or other vessel, until softened, and then beaten with a wooden spatula until it assumes a perfectly white and creamy appearance. It is then again introduced into the jars without allowing any unfilled interstices, covered with rose water and stopped.

With these precautions cucumber ointment readily keeps from season to season. There are several formulæ for this preparation which vary in the proportion of juice, and the manner of incorporating its odorous principle, but the above embraces all the points essential to success.

ART. IV.—VALUE OF OPIUM IMPORTED AND EXPORTED FROM 1827 TO 1845.*

	VALUE IMPORTED FROM						VALUE EXPORTED TO					
Yrs.	England.	Turkey.	France.	Italy and Trieste.	Other places.	Total	Dutch E. Indies.	Gibraltar and Br. E. Indies.	China.	Asia.	Other places.	Total
1827	$12,984	$372,191		$664	$1,722	$387,561	$9,488	$81,859	$301,804	$400	$739	$394,290
1828	5,728	144,675	$2,982	9,713	432	163,530	1,521	515	135,605		2,158	139,799
1829	1,690	92,924	12,187		370	107,171	8,011		103,247	6,214		117,472
1830	1,623	132,222	467		5,284	139,596	17,625	5,532	69,392	9,766	470	102,785
1831	26,245	149,359	533		599	176,736	75,720		650	15,020		91,390
1832	1,466	234,473	3,905		4,040	243,884	52,568		1,558	41,984		96,110
1833		87,638				87,638	28,163		11,043	13,954	519	53,679
1834	5,150	99,700	2,580		2,570	110,000	29,188		16,548	14,764		60,500
1835	38,204	62,109	48;071	14,836	9,195	172,415	9,790		50,925	1,957		62,672
1836	33,178	420,911	6,451	3,507	5,849	469,896	147,176	3,725	118,470	13,616	2,625	285,612
1837	9,715	42,715	1,425	2,954	252	57,061	12,171		52,221	38,887	2,441	105,720
1838	12,833	64,969	1,450		4,474	83,726	9,933			6,720		16,653
1839	22,887	191,764	5,105	5,795	29,424	254,975	5,870			10,192	420	16,482
1840	3,018	26.692	414	7,747	3,003	40,874	4,533			4,850	3,275	12,658
1841	38,298	205,933	910	2,590	7,868	255,599	5,198			10,211	1,557	16,966
1842	17,677	19,836			965	38,478		960		8,215		9,175
1843	3,000	15,393				18,393			900	12,661		13,561
1844	7,062	53,055	920		3	61,040	5,296		7,321	6,232	3,538	22,381
1845	25,530	7,755	104	324	3,925	37,638		336		18,210	376	18,922
	$261,138	$2,434,614	$84,924	$48,130	$77,405	$2,906,211	$422,251	$92,927	$869,684	$233,853	$18,118	$1,636,833
Exported,	-	-	-	-	-	1,636,833						
Consumed and on hand,		-	-	-	-	1,269,378						
Average Annual Consumption,			-	-	-	66,809						

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* Derived from the records of the Treasury Department at Washington, and communicated for this Journal by Dr. J. B. Biddle of this city.

ART. V.—ON THE PROPERTIES OF THE ASCLEPIAS CURASSAVICA, OR BASTARD IPECACUANHA.

By W. Hamilton, M. B.

Among the most frequent weeds which infest the pastures in most of the West Indian islands, Nevis and St. Kitts more especially, there are few more attractive to the eye, or more injurious to the cattle that feed upon it, than the Asclepias curassavica, known to the English inhabitants by the names of *Bastard Ipecacuanha* or *Redhead;* the former of these names being derived from the emetic property of its roots, and the latter from the colour of its umbel of flowers.

The Bastard Ipecacuanha is a plant with an herbaceous stem of from one to three feet in height, abounding in a milky sap, bearing umbels of bright red flowers to be met with at all periods of the year. Browne and Swartz both speak of a variety with white blossoms, common in the cooler parts of Jamaica. But I found an Asclepias with blossoms of this description growing in the immediate vicinity of Cape Henri, Hayti, which possessed characters sufficiently distinct from the Asclepias curassavica, and which appeared, as far as my experience went, to be invariably and unchangeably perpetuated from its own seed, a character not altogether consistent with the commonly received idea of a variety. Among other differences which must distinguish the Asclepias nivea from the Asclepias curassavica, independent of the colour of the blossoms and the general appearance of the plants, is the form of the leaves, which I have observed in the latter to be almost invariably *ovate lanceolate*, and in the former as invariably linear-lanceolate; such at least was the remark entered in my notes at the time; as, although the Asclepias curassavica with its red blossoms is a sufficiently common inmate of our collections in Europe, it has never been my fortune to meet a plant bearing the most distant resemblance to it, producing white blossoms, since I quitted Hayti. The Haytian plant appears in the form of its leaves to correspond with Plumier's *Apocynum Americanum Amygdali foliis longioribus, sp. 2, l.c.* 30. I met it in blossom in the months of June, July, and August; but while the Asclepias nivea is so abundant near the Cape, I experienced the greatest difficulty in obtaining a specimen of the Asclepias curassavica, which is so very common at Nevis and St. Kitts. Of the properties of the Asclepias with white blossoms, I can find no memorandum among my papers, but believe they were not regarded as different from those of the Redhead.

The root of this last contains an emetic principle, varying so much in the degree of its activity, as to render its operation dangerous and uncertain; and has hence occasioned its dismissal from regular practice. Among the poorer whites and blacks, however, it is occasionally employed as a cheap substitute for Ipecacuanha, the powdered root being administered, after having been previously infused in warm water and then dried, in doses of from one to two scruples. The same emetic property resides in the expressed juice, which is exhibited internally to the extent of an ounce or more.

The uncertainty which attends the emetic operation of this plant arises most probably from inattention to the proper season of gathering it: a similar uncertainty attending all the more active articles comprising our Materia Medica, which are derived from the vegetable kingdom; of which the Piscidia erythrina in the West Indies, and the Digitalis purpurea, and Colchicum autumnale in Europe, furnish familiar examples. The age of the moon also is another circumstance which demands consideration in connection with the season of the year; since whatever sceptics, whose range of observation has been confined within the limits of the temperate zones, may think, all who have a practical acquaintance with the perennial vegetation of the topics, are fully aware of the powerful influence which the lunar phases, in conjunction with the solar heat, exert over the circulation of the sap.

Might not the emetic principle be obtained in a detached form from the decoction or infusion of the root, or of the whole plant? or from the expressed juice? and if so, might it not be made a profitable object of trade with those islands in which it is found in such inconvenient profusion? These are questions calculated to repay the labour of solution.

But it is not for its emetic properties alone that the Asclepias curassavica is entitled to attention. It is a powerful astringent, and as such eminently serviceable in checking hæmorrhages; from which it has acquired, among the inhabitants of Jamaica, the name of the *blood-flower*. Dr. Barham illustrates this by the case of a gentleman who had been long suffering from hemorrhoidal hæmorrhage, for which all the ordinary routine of practice had been exhausted without effect, and his life was despaired of by his friends. "At last," as the doctor acquaints us, "he was advised to use this flower, which was immediately got (for they grow almost everywhere) and bruised, and the juice pressed out," which was injected by a syringe, and effectually arrested the progress of the bleeding.

He also found it equally effectual, as an internal remedy, in the cure of gonorrhœa; and mentions two cases in which he employed it with the most satisfactory results. In the first of these cases he had exhibited every remedy he could think of during a space of twelve months, without affording his patient the smallest relief. Baffled in all his attempts, he at length had recourse to the blood-weed, which he administered in the form of a decoction, made from the stems, leaves, and flowers, which was taken twice a day for about a week, when the discharge ceased, and never returned afterwards. In the second case, which from Dr. Barham's account, appears to have been one of seminal weakness, rather than virulent gonorrhœa, he recommended to his patient, an elderly gentleman, who had been labouring under this infirmity for years, an infusion of the blossoms of the Bastard Ipecacuanha, in place of his ordinary tea at the usual hours, for a month, at the expiration of which time he found himself perfectly recovered, and declared, to use the doctor's own words, "that it was worth its weight in gold," adding that "he believed if a man could make it known in Europe, he would get an estate by it." Dr. Barham speaks of having used it with equal success in a multitude of other cases of the like nature; and suggests a trial of it in leucorrhœa and other disorders of females.

A syrup prepared from the expressed juice, in doses varying from a teaspoon to a table-spoonful, is employed as a powerful vermifuge after other anthelmintics have failed. It operates frequently, as Grainger remarks, both as an emetic and a purgative, and he says, he has seen the most surprising effects from its exhibition. Dr. Wright also speaks favourably of its properties, and recommends the juice of the leaves, to the extent of from a teaspoonful to an ounce taken on an empty stomach, in worm cases; and says, that he can vouch for its powerful and salutary effect when administered in this manner. He objects, however, to the powdered root as unsafe, no doubt from the uncertainty of its operation and the difficulty of ascertaining, in consequence, the proper dose to produce the desired effect. This is an objection, however, which might perhaps be obviated in a great degree, if not altogether, by attending to the suggestions already given. Besides its emetico-cathartic operations in worm fevers, Dr. Wright says it acts on the urinary organs and the skin.

In the unpublished manuscripts of the late Dr. Anthony Robinson, the following instances of its styptic and antiseptic properties are given, and preserved by Lunan in his *Hortus Jamaicensis*, vol. 1., p. 65.

"Mr. Thomas Nicol, a practitioner in physic, informed me, upon my telling him of the styptic virtues of the Pseudo-Ipecacuanha, which Barham calls *blood-flower*, that a mule had, by some accident, been wounded in the thigh, from which a violent hæmorrhage of blood issued, which, after the ineffectual application of all the styptics in his shop, was stopped instantaneously by a negro applying a handful of the blossoms and leaves of this plant. Another time, by the use of the same plant, applied in the same manner, he saw an ass, with a large ulcerated wound, full of maggots, cured effectually: for it immediately killed the maggots, and then, cleansing the wound, healed it."

Such are the strong testimonials to the value of a plant which Heaven has bestowed with the most lavish profusion upon most of the islands composing the Archipelago of the West Indies, but which man, in the blind pursuit of unhallowed gain, contemptuously rejects, or ignorantly overlooks; and yet, when the hurricane has swept the cane from the grounds of the planter, or the drought has blighted his hopes of a profitable return, the lowly blood-weed might contribute its modest aid to lighten the burthen of his losses, and repair the ruinous effects of these fearful visitations.

The root of this weed, which calls for no care in its cultivation, and is exposed to but few casualties in its growth, which imposes no intolerable labour on the husbandman, and awakens little anxiety in the bosom of the planter, if gathered at the season of the year in which its properties are most active, and dried in the same manner as that of the Rheum palmatum, or, which may probably be a preferable mode, the alkaloid or other active principle on which its emetic quality depends, extracted on the spot, may yet furnish a valuable addition to the imports from our colonies, and contribute, in some degree, along with other hitherto neglected objects of industry, some of which have been already pointed out, to lighten the evils of bad seasons and the uncertainties of cane and coffee cultivation.

I regret much having omitted, while on the spot, to investigate the properties of the Asclepias nivea, which I too hastily assumed to be identical with those of the Asclepias curassavica. An examination of these properties, and a determination of the question, started by Browne and Swartz, at to their being but varieties of one species, and points worth the attention of those whose residence on the spot enables them to apply themselves to their solution.—*Lond. Pharm. Journ.*

ART. VI.—CONCENTRATION OF COMMERCIAL NITRIC ACID.

Mr. Redwood laid before the Pharmaceutical meeting a specimen of very strong nitric acid, obtained by concentrating the ordinary nitric acid of commerce. He observed that as an unusual demand had recently arisen for the strongest nitric acid, in consequence of its use in the preparation of *Gun Cotton*, he thought it might be acceptable to some of the Members of the Society, to be informed of an easy and economical method of making such an acid. Independently of the requirement of this acid for the purpose to which he had alluded, the Pharmaceutical Chemist was directed to use nitric acid of sp. gr. 1.5, in some of the preparations of the Pharmacopœia, and therefore ought always to be able to obtain it when required. Acid of this strength was not commonly met with in commerce. Some of the manufacturers had recently commenced supplying it; but, as it is very prone to undergo decomposition, especially if exposed to the light, and as the water of the decomposed portion is transferred to that which remains, it could not be kept for any length of time without becoming weaker that the specified strength, and therefore ought to be made in small quantities as required. The process which he recommended for concentrating commercial nitric acid, consisted in mixing it with oil of vitriol, and submitting the mixture to distillation with a gentle heat. If commercial nitric acid, sp. gr. 1.42, be mixed with its own volume of oil of vitriol, and distilled by the heat of a sand-bath cautiously applied, a quantity of acid, equal to two-thirds that of the nitric acid introduced, might be drawn over, and this acid would have a specific gravity of 1.514 to 1.52. This process had been recommended some years back by M. Millon, and it was the process alluded to in the last number of the *Pharmaceutical Journal*, in the paper on Gun Cotton. Millon and other chemists, however, had stated that the nitric acid thus obtained, was always contaminated with sulphuric acid. Had this been the case, it would have entirely precluded the adoption of the process for preparing nitric acid for pharmaceutical purposes, but he, (Mr. R.) had found, from repeated experiments, that if care was taken not to apply more heat than was necessary to bring over the nitric acid, and not to push the distillation too far, the distilled acid was quite free from sulphuric acid, and was in every respect as pure as that made by the process of the Pharmacopœia. In some respects, this process possessed advantages over that of the Pharmacopœia; the acid produced was stronger, and was less coloured by nitrous acid. His object, in alluding to the subject on this occasion, had merely been to direct attention to an easy and economical method of obtaining the strongest nitric acid that could be made, and at the same time to correct an error which had prevailed, to the effect that acid, so prepared, was not pure.—*Ib.*

ART. VII.—ON THE OIL OF MONARDA (HORSE-MINT.)

By A. E. Arppe.

The oil of *Monarda punctata*, which is officinal in the United States, separates readily into an elæoptene and stearoptene. The first forms a yellowish-red fluid, which possesses the odour of thyme, and passes over when distilled with water of a bright yellow colour. The oil, thus purified and freed from water, boils at 435° F., when it becomes of a darker colour. As it cannot be assumed that this oil, the boiling-point of which approaches so closely to that of the stearoptene, was obtained perfectly free from the latter, no safe conclusion as to its composition can be expected from the analysis, which yielded 86.41 per cent. C, 9.85 H, and 3.74 O. Exposed to the air, or placed in contact with substances containing much oxygen, it very easily changes to a resin, becoming brown and thick, and exhibits on analysis a considerable decrease in the amount of carbon.

The stearoptene forms large crystalline fragments, which are coloured yellowish by the adherent fluid oil, and the odour of which has a striking resemblance to that of thyme. It can be obtained perfectly colourless by pressure between blotting paper, and quite pure by distillation either alone or with water. When submitted alone to distillation, the product solidifies in the recipient immediately, and forms very distinct crystals of remarkable lustre, which retain the above-mentioned odour and have an acrid burning taste. It leaves on distillation a small quantity of a brown resinous mass, which is soluble in alcohol. When the crystals thus obtained are distilled with water, they melt to an oil, and appear to undergo some change, as during ebullition the oil floating on the water becomes brownish; however, it distils over entirely, and the residuary water, which is wholly destitute of smell, has only a faint brownish tint. The distillate floats as a colourless oil on the water, and exhibits the remarkable property of retaining its fluid state for a very long time; but congeals, on being touched with a hard body, immediately at the point of contact, and extending rapidly over the entire surface of the oil. The greater portion forms large regular crystalline plates, but a few drops change into small spherical tufts. The crystals or spheres thus produced are distinguished by their opacity and their decomposed appearance from those obtained by the distillation of the stearoptene alone. To render them transparent and lustrous, it is only requisite to melt them and allow them to solidify; but if melted frequently, the stearoptene passes into the non-crystalline state, without its being possible to state more precisely what conditions give rise to this peculiar behaviour. When the fluid stearoptene is touched with a hard body, the formation of crystals begins again, and the crystals are for the most part opaque; but in general it must have remained for some time in its fluid state before it can be thus brought to solidify. The stearoptene melts at 119°, and solidifies at 101°; when heated to 158°, it solidifies at 93°, when the thermometer rises again to 101°; heated to 221°, it congeals at 92°, upon which the thermometer ascends to 99°; heated at 284°, it solidifies at 88°, and the thermometer subsequently ascends to 96°; lastly, when heated to 338°, it solidifies at 81°, and the thermometer ascends to 95°. Its boiling point is 428°.

These numbers show that the point of solidification descends as the heating point rises, and that the liberated heat amounts up to 275° only to 7°, but at 338° it is already 14°. At this temperature, when more caloric is set free, its tension is greater and its escape easier, which facilitates crystallization; to which is likewise owing the circumstance, that the stearoptene, when distilled alone and consequently heated to 228°, cannot persist in the fluid modification; on the contrary, when distilled with water, all the conditions requisite to its production are given.

The stearoptene is very easily soluble in æther, and especially in alcohol, and separates in crystals from both solutions on spontaneous evaporation. The substance was purified for analysis by three distillations, and the combustion made in a current of oxygen. The author found—

Carbon,	79.77	79.88	80.00	10	80.00
Hydrogen,	9.25	9.50	9.52	7	9.33
Oxygen,	10.98	10.62	10.48	1	10.67

If we regard this stearoptene as an oxide $= C^{10} H^{7} + O$, we find such a relation between its composition and that of the elæoptene from which it separated, that it may assume in the elæoptene 3 atoms of the same radical combined with 1 atom of oxygen $=3C^{10} H^{7} + O$, with which the per centage composition found agrees tolerably well.

When dry muriatic gas is passed over the solid stearoptene, it very quickly becomes brown, and after removal of the excess of acid purple-coloured. The effect is the same whether the mass be warmed or heated to boiling; on cooling it separates in dark purple crystals, which however consist for the greater part of unaltered stearoptene, as was to be expected, since the total increase in weight did not amount to more than 2 to 3 per cent. On distilling the coloured crystals in a small retort, the stearoptene first passes over quite colourless, but the red compound likewise distils over unaltered. Caustic alkali turns the red colour to blue, and on the application of heat into emerald-green, both which colours gradually return to red on exposure to the air. The red mass yields a beautiful blue solution with hydrate of barytes. When carbonic acid is passed into this, the baryta is precipitated, and at the same time the colouring substance, which imparts a blue colour to the precipitate, which colour however subsequently becomes red. At last the entire precipitate is bright red and the precipitate colourless. The red colouring substance can be extracted with alcohol from the red baryta compound, and obtained in a solid state by evaporating the alcohol as a dark violet amorphous mass. It is volatilized by heat as a red gas, resembling indigo-blue, contains chlorine, and can be distilled without decomposition.—*Chem. Gaz. from Liebig's Annalen.*

ART. VIII.—ON THE PRODUCTS OF DECOMPOSITION OF GELATINE BY CHROMIC ACID.

.By A. Schlieper.

The best proportions for oxidizing gelatine by chromic acid are those pointed out by Prof. Marchand, viz. 2 parts ordinary glue, 8_4 of bichromate of potash, 15 of sulphuric acid, and 50 parts of water. The amount of sulphuric acid may be somewhat diminished, but not increased, otherwise the operation would not succeed, and nothing but formic acid would be obtained. The glue is first allowed to swell in the water, and the sulphuric acid then added; when the mixture has cooled, it is poured into the retort containing the bichromate in the state of a fine powder; distillation is now commenced, taking care to cool well, and the operation discontinued when the mass begins to swell. The distilled product is turbid, has an acid reaction, and a strong odour of prussic acid, of which it contains a large quantity. It is redistilled over oxide of mercury, collecting only the first portions; as soon as the liquid which passes has lost its aromatic odour and is decidedly acid, it is tolerably certain that all the oily constituents have passed over. The product amounts to from one-fifteenth to one-twentieth of the whole. After having separated the oily portions, the recipient is changed and the distillation continued; a turbid liquid now passes, which contains the volatile acids in solution; it is neutralized with barytic water, and after evaporation the barytic salts decomposed by sulphate of soda, and the soda salts submitted to distillation with dilute sulphuric acid. The product thus obtained is a concentrated aqueous solution of the volatile acids; it has a strong smell of vinegar and cheese. To effect the separation of the acids, the liquid is saturated with carbonate of soda and evaporated to dryness, the dried soda salt reduced to powder and agitated with dilute sulphuric acid (1 part of acid to 3 of water) in a narrow cylindrical glass. The liquid separates into two strata: one is aqueous, and crystallizes in part; the supernatant one is oily. From the analyses of the author, it results that the latter is a mixture of *acetic* and *valerianic* acids; the crystallizable acid possessed the composition and all the characters of *benzoic* acid.

The *prussic* acid had remained in combination with the oxide of mercury in the form of a basic cyanide $= HgCy + HgO$, which has been described by Berzelius in his 'Manual of Chemistry,' vol. iii. p. 871.

The author has established the identity of the preceding bodies by analysis.

To extract the volatile oils produced by the action of the chromic acid, the aqueous portions which passed first were repeatedly rectified, each time collecting only the first portions which were then in their turn rectified. In this way there was finally obtained an aqueous liquid, upon the surface of which the volatile portion had separated in the form of an oil; the water was saturated with chloride of calcium, decanted, and rectified over fused chloride of calcium. This oil contains two peculiar bodies, which are separated by the difference in their boiling-point.

Valeronitrile is the least volatile oil, very fluid, limpid and colourless; it is lighter than water, and has a density of 0·81; it dissolves to some extent in water, and distils readily with the vapour of water; it is neutral, and possesses an acrid aromatic taste; its odour resembles that of oil of bitter almonds, or of hydruret of salicyle. It burns with a white luminous flame, and is composed of $C^{10}NH^{9}$. Hydrochloric and nitric acid have no action upon it, but sulphuric acid converts it into valerianic acid, which is set free, and into sulphate of ammonia. It is not altered by ammonia. It dissolves in alcohol and æther in every proportion, and it boils at 257°F. It is attacked by chlorine and bromine when exposed to the rays of the sun.

Valeracetonitrile is a volatile oil of a similar odour to the preceding substance, but more agreeable. It boils betwixt

154° and 158°F.; its density is 0·79; its taste is acrid. On analysis it was found to correspond to $C^{26}H^{24}N_2O^6$.

Ammonia, hydrochloric and sulphuric acids do not alter it, but concentrated sulphuric acid decomposes it in a similar manner to the preceding body, and there is formed sulphate of ammonia, while acetic and valerianic acids are set free.

When chlorine is passed into it the liquid becomes heated, and on cooling deposits beautiful crystals of a chlorinated compound. Bromine acts in the same manner, giving rise to two bodies, one crystallizing in small needles, the other liquid, and which violently attacks the eyes and olfactory organs.

Towards the end of the distillation of the crude product yielding the two preceding oils, the author obtained a heavy oil, which had the smell of cinnamon; but he was not able to investigate it more minutely, from want of material.—*Ibid, from Liebig's Annalen.*

ART. IX.—ON THE MALAMBO BARK OF THE PROVINCE OF CARTHAGENA, SOUTH AMERICA.

By W. Hamilton, M. B.

In the third volume of the *Pharmaceutical Journal*, page 169, I observed an interesting and instructive paper, by Mr. Ure, on the *Malambo* or *Matias* bark, of New Granada, with some notice of its sensible qualities.

Having, as far back as the year 1825, received a portion of bark, under the former of these names, from my indefatigable correspondent, Edward Watts, Esq., British Consul at Carthagena, accompanied by extracts from some of the Spanish writers on the natural history and productions of that province, detailing its medicinal properties, but without furnishing any clue to the localities in which it is to be found, or the botanical character of the tree from which it is obtained, I turned with some eagerness to Mr. Ure's paper, in the hope of meeting in it some portion of that information which I had failed to procure from other sources; but in this expectation I was disappointed.

It appears from Mr. Ure's paper, that a bark, known by the name of *Malambo,* was received in Europe at least nine years before the date of the letter which accompanied the specimens sent home from Carthagena by Mr. Watts, of which an analysis, made by M. Cadet Gassicourt, appeared in the 2d volume of the *Journal de Pharmacie,* and a second analysis, by the celebrated Vauquelin, is to be found in the 96th volume of the *Annales de Chemie,* from which, as Mr. Ure's paper informs us, the active constituents of the bark appear to be an aromatic volatile oil, a very bitter resin, and an extract soluble in water; but neither tannin, or any of the alkaloids of cinchona, were found, and only a slight trace of gallic acid.

But in the absence of a satisfactory description of the botanical characters, we are unable to determine the identity of the several specimens submitted to examination, and it remains as much a qnestion as ever whether the tree which furnishes it belongs to the genus *Drymis,* as many botanists conjecture—to the genus *Quassia,* as M. Bonpland somewhat hastily concluded, or to some genus not hitherto submitted to botanical examination.

I regret my inability to throw more light upon this part of the subject than those who have preceded me; but, as connecting links in the medical history of a substance which, although known in Europe for upwards of thirty years, still slumbers in mysterious obscurity, and is far from being appreciated to the extent it merits, the following fragments of its local history may not be deemed wholly misplaced among the Transactions of the Pharmaceutical Society.

In a work, on the natural productions of the province of

Carthagena, by Don Jorge Lopez,* the date of which I unfortunately do not possess, that writer states:

> "Se dia, en la Provincia de Cartagena, un arbol de la misma altera de los *Quinos*, nombrada Malambo, cuja corteza, en mi concepto, tiene qualidades mas recommendables que le *Quina;* ella abunda de un *Aromatico* tan constante y penetrante que jamas lo pierde, y por supuesto abunda tambien de partes *gomosas* muy utiles, à mi ver, a la naturaleza; es indigena de esta Provincia, y *se encuentra con abundancia.* Su corteza es que hablo, y creo que si se dedicasen los facultativos à hacer uso de ella, *la Quino perderia su concepto.* En este pais la, aplican à diversos males con ventaja conocida, en particular yara los *pasmos, heridas, inflamaciones, males del estomago.* A mi ver produciria un efecto admirable en la *hydropesia* y *fiebres malignes;* por varias observationes que se han hecho, es eficax para las *asmas, rheumatismo, disenteria, supreciones de menstruas.* En fin, en el pais, y, en particular, en los campos, es un remedio general aplicado, con felix suceso, en todas las enfermedadas referidas."

"A tree exists in the province of Carthagena, of the stature of the cinchona, called the *Malambo,* whose bark, in my opinion, possesses qualities far superior to those of the cinchona. It abounds in an aroma, so durable and penetrating, that it is not impaired by any lapse of time, and must, therefore, I imagine, consist of gummy particles of great value to man. It is a native of this province, and very abundant. I speak of its bark, and were the faculty to employ it, cinchona would sink into disrepute. It is employed with known advantage in this country, in the treatment of various complaints, especially in spasms, wounds, inflammations, and disorders of the stomach. It would, I think, be highly beneficial in cases of dropsy and malignant fevers. Experience has proved its efficacy in asthma, rheumatism, disentery, and menstrual obstructions, in my own practice. In fine, here, and in the country especially, it is an universal remedy, employed with the happiest effect in all the above-named complaints." In another rare and valuable Spanish work, in the possession of Mr. Watts, and from which that gentleman also favoured me with an extract, it is spoken of as follows:

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* Don Jorge Lopez was an Apothecary, residing in the town of Carthagena, near the British Consulate, at the time Mr. Watts was there.

"El tercero* es el Malambo, enja corteza aromatica es un antipasmodico eminente, de un amargo may activo, febrifugo, y astringente. Lo hay con abundancia en la Provincia de Santa Maria, donde la aplican para curar *pasmo*, *calenturas*, *intermittentes*, y la *dysenteria;* y tambien se encuentra en varios territorios de esta Provincia. Se hacen algunas extracciones de su corteza para la Habana, y alli lo usan con mucho suceso contra el *pasmo* àque son muy propensos los negros; y desde que tienen este specifico, casi no muero ninguno de el. Acqui no se aplica para nada, y hace pocos dias hemos, vista morir un joven apreciable, por no haberle dado en tiempo este remedio. Es un vegetal importantissimo, que merece la atencion del Gobierno por las virtudes, que dexamos expuestas, y aplicaciones que se hacen de el en Santa Maria, como por el color y olor de su corteza, tenemos razones para creer sea del genero *cusparia*, *ó quino de Angostura*, de que se compone parte de la receta del difunto Dr. Mutis, para curacion de la *dysenteria*, y no dudamos asegurar que, à falta de esta, puede suplir la CORTEZA DEL MALAMBO."

" The third is the MALAMBO, whose aromatic bark is a powerful antispasmodic, containing bitter febrifuge and astringent properties of great activity., It abounds in the province of Santa Martha, where it is employed in the cure of *spasms*, *intermittents*, *calentures*, and *dysenteries;* it occurs also in various parts of this province (Carthagena.) The bark is exported to the Havannah, where it is exhibited in the treatment of spasms (*tetanus?*) to which the negroes are very subject; and since the adoption of this remedy hardly any deaths arise from this complaint. Here we make no use of it; and very lately (in 1810, at Carthagena) we have witnessed the death of a valuable young man from the neglect of exhibiting this remedy in sufficient time. It is a most important vegetable production, meriting the attention of government from the valuable properties it possesses, and the use made of it at Santa Martha.

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*The other three are the Guayacan, Ariza, and Guarumo

Both from the colour and smell of the bark, it would appear to belong to the genus *cusparia*,* or the *cinchona* of Angostura, which entered into the composition of the prescription of the late Dr. Mutis for the cure of dysentery; and we have no hesitation in saying that the bark of the malambo may supply the place of that of the *cusparia.*"

I distributed the specimens of the bark received from Carthagena among my medical friends here, and sent a portion to Dr. Bostock, of Great Coram Street, London. From the former I was unable to obtain any report; from the latter I received a reply, of which the following is a copy, dated London, 11th December, 1825:

"SIR,—I regret that so long a time should have elapsed since the receipt of your letter. When it arrived I was from home; and have, since that time, been very particularly engaged. The account which is given of the bark is certainly very much in its favour, and its sensible properties are such as to render it probable that it may be an useful article of the Materia Medica. The only plan, however, to establish a point of this nature would be to send a quantity of the substance to some hospital or dispensary, where a number of trials might be made of it by any person in that kind of extensive practice. Its taste and odour would make one suppose that it may be found useful in affections of the stomach and bowels, as is the case with *Colombo* or *Angostura;* and even, if its properties were found to be very similar, still, it might be very important to have a variety of articles. As I have no connection with any medical charity, it will not be in my power to give you any assistance, and I think it will be your best plan to apply to some practitioner in your neighbourhood. I am, &c.

J. BOSTOCK."

Such was the abortive result of my endeavours to obtain a fair trial and full report of the value of this bark in practice. Since that time my specimens have been lost, and the subject was almost completely obliterated from my recollection, till the paper, to which I have referred, summoned it from the regions of oblivion, and induced me to seek for further information in the faded records of past correspondence.

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* *Blonplandia trifoliata.* Had this conjecture been well founded, the resemblance must have struck Dr. Bostock, which does not appear from his letter to have been the case.

Had such a body as the Pharmaceutical Society been co-existent with the facilities for foreign and colonial correspondence which I then enjoyed, and of which I fully availed myself for the service of the public, the mystery which to the present moment involves the tree yielding this valuable bark would most probably have been long since cleared up, and botanists would not only be familiar with the characters of the inflorescence and fructification, but our Materia Medica might have been enriched by an elegant, agreeable and active tonic.

From the accounts given by the Spanish writers, Don Jorge Lopez and Don Ignacio de Pombo, the friend and companion of the lamented Mutis, in the extracts just given from their respective works, we learn that the MALAMBO is a tree of common occurrence in the forests of Santa Martha and Carthagena, and may no doubt be found throughout the whole of the littoral chain which stretches from Punta Paria, in the east, to the Gulph of Maracaybo, and thence westward through the provinces of Santa Martha and Carthagena to the Gulph of Darien; and as the Flora of Trinidad is but an extension of that of the continent, it is by no means improbable that the MALAMBO is also a denizen of those unexplored forests which wave in perennial verdure beneath the British flag. It were, therefore, much to be desired that some of our merchants residing at Santa Martha or Carthagena, the localities clearly indicated in the foregoing extracts, could be induced to procure well authenticated specimens of the bark, seeds, fructification, and inflorescence of the tree so highly spoken of by the writers already named, and transmit them for examination to the Pharmaceutical Society, the legitimate body for conducting such inquiries. The botanical characters being once clearly determined, it would be comparatively easy to ascertain its existence in the forests of Trinidad; or, if its value were found to correspond with the high character given to it, the seeds might be obtained and plantations formed in Trinidad and others of our islands, which would in process of time add much to the diversity and importance of their exports, and contribute somewhat likewise to the strength of the artillery which the medical practitioner employs to repel the assaults of mortality.—*Pharm. Jour.*

ART. X.—ON THE PURIFICATION OF COBALT FROM ZAFFRE.

By Mr. B. H. Paul,
Assistant in the Laboratory of the Pharmaceutical Society.

Having found that the process for obtaining a salt of cobalt from zaffre, by the use of oxalic acid, was attended with considerable inconvenience, and did not yield a pure product, I have endeavoured to ascertain whether some other more advantageous process might not be employed; and among others it occurred to me that the process adopted by Mr. Phillips for the quantitative separation of this metal from nickel, if somewhat modified, would answer for for the purification of zaffre. This process is founded upon the property possessed by nickel of being precipitated by potash from an ammoniacal solution of the two oxides, while cobalt is unacted upon.

The zaffre of commerce consists essentially of impure oxide of cobalt, obtained by roasting the sulpho-arseniuret of cobalt, or cobalt ore, and mixing the product with a quantity of sand; it contains, besides cobalt, iron, copper, bismuth, and nickel.

This is treated with hydrochloric acid, which dissolves al but the sand, and the liquid evaporated to free it from excess of acid; on the addition of water, a white substance remains undissolved, which contains so large a quantity of bismuth, as to render it worth preserving. The solution now contains cobalt, nickel, iron, copper, bismuth, and arsenic, and on passing sulphuretted hydrogen through it, copper, arsenic, and bismuth are precipitated; after driving off the excess of sulphuretted hydrogen by the addition of a little hydrochloric acid and boiling, oxides of nickel, cobalt, and iron are precipitated by ammonia, an excess of which dissolves the first two, and iron may be removed by filtration.

To the ammoniacal solution largely diluted with water, that has been well boiled to free it from air, potash is added, which precipitates nickel; it is then filtered, and sulphuretted hydrogen passed through it; this forms sulphuret of ammonium with the ammonia present, which, reacting on the oxide of cobalt, precipitates the sulphuret of cobalt. This, when well washed, may be treated with acids, to form any of the salts.

I have tried this process several times, and find it to answer perfectly; a pure salt may thus be obtained at a very moderate cost, and a considerable quantity of bismuth as a bye product. The objections to the use of oxalic acid are that the nickel cannot be separated thus, as its oxalate is as insoluble as that of cobalt, and that the product being an insoluble salt, requires to be reduced with heat, in order to make the other salts.—*Ib.*

ART XI.—PROCESS FOR PREPARING CANNABINE (?), OR HEMP RESIN.

BY T. AND H. SMITH, EDINBURGH.

THE following method for the preparation of hemp resin, among several tried by us successively, is the one to which we give the preference; and, agreeably to promise, we now send the details for publication in the *Pharmaceutical Journal.*

The plant is, after being bruised, digested in repeated portions of moderately warm water, pressing out at each time till the water comes away colourless. It is then digested in a solution of crystallized carbonate of soda, using of this half the weight of the quantity of dried gunjah operated on. After macerating at a moderate heat for two or three days, the liquid is pressed out, and pure water substituted; and this is repeated till the water comes away nearly colourless. The washing is for the purpose of removing a large quantity of brown colouring matter, which we have found it difficult to remove in any other way than this. The alkali removes a further quantity of colouring matter, along with a large quantity of a fatty acid, *quite inert*, which may be got by adding an acid to the alkaline liquid after filtration. The plant is now dried till it ceases to lose weight, and then macerated or percolated with strong rectified spirit of wine. To the spirituous solution a milk of lime, as thick as cream, is added, containing one ounce of fresh burnt lime for every pound of the plant. The lime removes any of the fatty acid and chlorophylle which may have been left by the soda. After filtration, a slight excess of sulphuric acid is added to throw down in the state of sulphate the lime left in the liquid; for this purpose, one or two fluid drachms for every pound of the dried plant will be quite enough.— A little pure animal charcoal is now also added, and shaken with the liquid for some time. We may mention that the decolourizing action of the charcoal is very limited; for, after acting with one portion and filtering, and repeating the process with another, the filtered liquid on comparison will not appear any lighter in colour than the first. The greater part of the spirit is now, by distillation, recovered from the filtered liquid, and the resin washed out with a small quantity of rectified spirit. Three or four times its bulk of water is then mixed with the liquid, and the dish (a porcelain basin) is set aside till the spirit has completely escaped by evaporation. The resin, being heavier than the watery liquid now left, remains at the bottom of the dish. The fluid is now carefully poured off, and fresh water used till it comes away free from any sour or bitter taste. The resin is now dried either spontaneously or by the aid of heat; and to expedite the drying, it is spread out occasionally in a thin layer on the side of the dish.

The resin is brown in mass, but of a fawn colour, in thin layers. Heated on platinum foil it melts into a liquid, takes fire, burns with a bright white flame, and disappears entirely. Two-thirds of a grain acts upon ourselves as a powerful narcotic, and one grain produces complete intoxication. In this character it is quite analegous to alcohol, but in its hypnotic and soothing effects on the nervous system, its resemblance to morphia is very great. It contracts the pupil. It does not seem to have any spasmodic or paralysing action upon the bladder.

One experiment of ours shows that the peculiar action of hemp resin on the human system is not easily destroyed, and is retained with great tenacity. We heated in the open air a dose of the resin, spread out so as to cover nearly two square inches of the bottom of an evaporating basin, at a temperature of 180° Fahr., for eight hours continuously, notwithstanding which treatment it appeared to us on trial not to have suffered the least diminution of its energy. The resin contains the whole power of the plant, which we have proved by taking a quantity of the plant equivalent to a dose of the resin. We could observe no difference in strength of action. The dried gunjah yields from 6 to 7 per cent. of the resin.—*Ibid.*

ART. XII—.ON QUINOIDINE.

By Mr. Redwood.

Since the publication of the fact that the amorphous quinine, for which a patent has been taken out in this country, is neither more nor less than the substance which has long been known in commerce under the name of *Quinoidine* or *Chinoidine*, numerous inquiries have been made as to the difference, if any, *in quality*, between the patented preparation, and the quinoidine in the state in which it is met with in commerce. Most of the wholesale houses are now supplying quinoidine at one-fourth the price of the patented amorphous quinine, and there can be no reason why the former should not in all cases be substituted for the latter, if it be found to be equal to it in quality.

It has been already shown that quinoidine and the patented amorphous quinine, are both mixed products, containing several proximate principles, and that one part of these principles is soluble, the other insoluble in ether. Even the part which is soluble in ether, is found, on examination, to consist of two or three bodies, which, to a certain extent, may be separated by crystallization. No method, however, has yet been pointed out by which the whole of these bodies may be readily and completely separated from each other; indeed, the task would be nearly as difficult as that of resolving a specimen of extract of bark into its proximate constituents.

But although quinoidine and the patented amorphous quinine have no more title than some of the medicinal extracts to be classed among definite chemical bodies, yet we may judge of the qualities of different specimens of these substances, by the examination of their physical and chemical characters.

Quinoidine, it is well known, is obtained from the dark coloured mother-liquor remaining after the crystallization of the disulphate of quinine. In the evaporation of this liquor, similar changes no doubt take place to those which occur in the preparation of extracts; and the quinoidine which is precipitated by the addition of an alkali, will be subject to variations, according to the greater or less degree of heat, and of atmospheric action to which the liquor has been exposed. Again, if, instead of adding an alkali to precipitate the quinoidine, the liquor be simply evaporated to dryness, the product, will, of course, be very different; it will now be more or less soluble in water, in consequence of the presence of the acid. Some specimens of quinoidine are said to have been obtained in this way.

Thus quinoidine is liable to variations in quality and in composition, arising from two distinct causes.

In examining specimens of quinoidine, with the view of estimating their qualities, the following method may be adopted:

The specimen should be dried by the heat of a water-bath, until it ceases to sustain any further loss of weight.

(*a*) A weighed quantity of it is to be dissolved in distilled water acidulated with sulphuric acid, and ammonia added to the solution as long as any precipitate is formed. This precipitate is to be collected on a filter, washed, dried by the heat of a water-bath, and then weighed. The two weighings should correspond, if the specimen be good.

(*b*) A portion of the dried specimen is to be treated with rectified spirit, in which it should be perfectly soluble. Those specimens, the solutions of which have the lightest colour, are most free from smell, and in taste approach to a pure bitter, may in these respects be considered the best.

(*c*) A weighed quantity of the dried specimen is to be treated with ether as long as anything is dissolved by this menstruum, the solution being promoted by trituration in a mortar; the ethereal solution is to be submitted to spontaneous evaporation in a large porcelain dish, and the insoluble residue dried by the heat of a water-bath, and weighed. The insoluble part should not amount to more than thirty per cent. of the dried specimen. After the residue of the ethereal solution has stood for several days, it should be examined under a microscope, when it will be found to contain two kinds of crystals, one small and acicular—the other larger, in rhombic prisms. The former of these is quinine, the latter cinchonine, the proportions of which vary in different specimens.

I have met with no specimens, at present offered for sale in the London market, in which the presence of foreign matter was indicated by the tests (*a*) and (*b*). On treating different specimens with ether, as described (*c*), considerable difference is indicated. Some specimens contain as much as thirty-five per cent. of insoluble matter, while from one specimen that I have examined, there was only twenty-five per cent. of residue.

There is a difference in the appearance of the insoluble residue obtained from different specimens; in some cases it is much darker coloured than in others. The specimen yielding twenty-five per cent. of residue, is the best that I have met with; when reduced to powder, it is of a light brown colour; it forms a solution in spirit, or in water with the addition of an acid, which is not so nauseous in taste, as similar solutions formed from some other specimens, not excepting the patented preparation. Moreover, the portion insoluble in ether, is of a much lighter colour than that obtained from the other specimens. This specimen appears to have been less exposed than the others to heat and other decomposing agencies.

I understand that some amorphous quinine, prepared according to Liebig's process, by solution in ether, has been made; but this will not, probably, be offered for sale, until the specification of the patent has been filed, when it will be known what the patentee's process is, and how far it will affect the manufacture and sale of Liebig's preparation by other parties.

There can be no doubt, however that *quinoidine* may be made and sold as heretofore, without any reference to the patent; and it will be a question for the profession to consider, whether they will purchase it under its old and well-known appellation, and at its fair market value, or whether they prefer paying for the privilege of using it under a new, assumed, but false title.—*Ibid.*

Note.—In our October number, an article on Amorphous Quinia appeared from the pen of Baron Liebig, which exposed the fact that a large portion of the Quinoidine or precipitated extract of Bark of European commerce, was composed of the alkaloid Quinia in a peculiar condition isomeric with ordinary quinia, and capable of forming salts,—and is in fact the active agent in the black extract-like substance officinal in our Pharmacopœia of 1830, under the name of "Impure Sulphate of Quinia." Quinoidine is the matter precipitated when carbonate of potassa is added to the mother liquor that yields "impure sulphate of quinia" by evaporation. The London pharmaceutists and chemists have been thrown into a ferment, by the announcement that a patent had been granted to J. Lloyd Bullock, for the exclusive preparation of "Amorphous Quinia" on behalf of a foreigner;—and as this announcement was not made until after the publication of Liebig's paper, and the general currency of the facts contained in it, when the manufacturers of sulphate of quinia had prepared themselves to furnish the article, these gentlemen think themselves illy used. Liebig's name is not used in the patent, but the editor of the Pharmaceutical Journal and others suppose that he is the "foreigner abroad" for whom the patent was obtained, which has called forth some severe animadversions. From the above paper by Mr. Redwood, the so-called amorphous quinia is little more than the quinoidine of commerce, and if so the patent can hardly stand. An extract from the patent follows.

W. P. Jr.

ART. XIII.—EXTRACT FROM A PATENT FOR PURIFIED QUINOIDINE, AMORPHUS QUININE, AND BASIC EXTRACT OF BARK.

[The first part of the specification granting the powers, &c., is omitted.]

Preparation of Purified Quinoidine or Chinoidine.—I take three pounds of the residue of quinine manufacture, termed chinoidine (which should be soluble in alcohol and in dilute sulphuric acid, and insoluble in water.) Nine ounces by measure of concentrated sulphuric acid diluted with one gallon of water, and dissolving the chinoidine therein, I then pass sulphuretted hydrogen through the solution for nine hours, for the purpose of precipitating metallic matters and other impurities. The mixture is then to be filtered through paper or other suitable material, as is well understood by chemists; it is then boiled to drive off excess of sulphuretted hydrogen, and an alkali or alkaline carbonate added, to precipitate the chinoidine. I use commonly for the above named quantity, three pounds of carbonate of soda, dissolved in one gallon of distilled water. The precipitate obtained is then to be well washed with distilled water, and dried over a water-bath; towards the conclusion of the drying, and in order to dry it more effectually, I place it in a chloride of calcium bath, and heat it a few degrees higher than 212°. It is then reduced to powder, and kept in well-closed bottles. This purified chinoidine may also be kept in solution in alcohol or other vehicle, or made into saline compounds. I prefer to sell it in a state of powder, it being more convenient in that form. I also prepare various saline compounds of purified chinoidine, by taking at the rate of one-twelfth less than of the amorphous quinine hereafter explained, and mix it with acids as hereafter explained in respect to amorphous quinine. In some cases it is desirable to dissolve the purified chinoidine in alcohol before mixing with the acids. These saline compounds I prepare for sale, either in solution or by evaporating them to the solid state, and reduce them when they will allow of it, to powder. In all cases, the preparation should be kept in well closed bottles.

The preparation of Amorphous Quinine.—I take three pounds of chinoidine as before, or in the purified state as above described (for this purpose it is best to use it before it is fully dried) and mix it well with twice its weight of pure sand, and digest in nine parts of ether (commonly known as sulphuric ether.) The specific gravity of the ether I believe most suitable, being about 735; I stir up the mixture three or four times during the digestion, which should continue twelve hours, and pour off the solution. To the residue I add nine pints of fresh ether, and proceed as before; I mix the two solutions, and allow them to settle; when perfectly bright, I pour off the fluid from the sediment into a retort or suitable vessel, and distil off the ether by means of a water-bath. The substance left in the vessel is to be dried in the same manner as is directed for the purified chinoidine. To this residue I apply the term *Amorphous Quinine.* The saline compounds are prepared by taking one equivalent of an acid in solution, and dissolving in it an equivalent of the amorphous quinine, considering carbon 6, oxygen 8, hydrogen 1. I take one hundred and sixty-two parts of amorphous quinine to each equivalent of acid, all which is understood by chemists, and I form basic neutral or acid salts, in the usual way.

Basic extract of Bark.—The residue left upon treating chinoidine with ether, in order to extract the amorphous quinine, contains also valuable medicinal matter. I take any given amount of this product, and calculating the amount of dry substance it contains, treat it with six times its weight of alcohol, generally preferring it 56° over-proof. I decant the clear fluid, and evaporate it to dryness, in the same manner as with amorphous quinine. To this product

I apply the designation *Basic Extract of Bark*, or I prepare this as follows:—To three pounds of the dry residue, as above, I add nine ounces by measure of concentrated sulphuric acid diluted with one gallon of water, and dissolve the same; and through this solution I pass sulphuretted hydrogen, and proceed in the same manner as when producing purified chinoidine, and in making solutions and saline compounds therefrom.

Having thus described the nature of the invention and the manner in which the same is to be performed, I would have it understood that I do not confine myself to the details herein described so long as the peculiar character of either part of the invention be retained; but what I claim is,

First, The manufacture of what I have called "Purified Chinoidine," by purifying and reducing that matter to a state of powder, as herein described; and I also claim the making alcoholic and other solutions of such purified chinoidine, and also the producing saline compounds thereof.

Secondly, I claim the manufacture of what I have called "Amorphous Quinine" by separating the matter soluble in ether from other matters, as herein described; I also claim the preparing alcoholic, ethereal, and other solutions thereof, and I also claim the preparation of saline compounds of the same.

And, thirdly, I claim the manufacture of what I have called "The Basic Extract of Bark," by separating such product by ether from the soluble matter, and preparing such extract as herein described, and producing alcoholic and other solutions and saline compounds thereof.

In witness whereof, I, the said John Lloyd Bullock, have hereunto set my hand and seal this twelfth day of November, in the year of our Lord one thousand eight hundred and forty-six.

JOHN LLOYD BULLOCK.

Ib.

ART. XIV.—ANALYSIS OF ALOES AND ALOETINE.

By M. Edmond Robiquet.

The specimen of the aloes examined, was obtained from M. Chevallier; it was found to contain the following constituents in 100 parts:

Pure aloes (*Aloëtine*)	85.00
Ulmate of potash	2.00
Sulphate of lime	2.00
Carbonate of potash Carbonate of lime Phosphate of lime	traces.
Gallic acid	0.25
Albumen	8

To obtain the *aloëtine* or *purified aloes*, commercial aloes, reduced to powder, was exhausted with cold distilled water, by which means none of the salts present, excepting the ulmate of potash, and a small quantity of sulphate of lime and carbonate of potash, are taken up. This solution was evaporated over a water-bath until reduced to one half, and an excess of neutral acetate of lead was then added, which threw down a light flocculent yellow precipitate, consisting of a mixture of gallate, ulmate, and albuminate of lead, and containing traces of carbonate and of sulphate of lead.

The solution now contained, in addition to the aloes, acetate of potash, and acetate of lime, resulting from double decomposition, and the excess of acetate of lead. On adding a sufficient quantity of ammonia, the precipitated oxide of lead carried down all the aloes contained in the liquor, forming a kind of lake of a pure orange-yellow colour, passing in a few minutes under the influence of the solar light, to a greenish-yellow. This lake, quickly separated and washed with boiling water, was decomposed by a current of sulphuretted hydrogen, atmospheric air being excluded. On the conclusion of this operation, the sulphuret of lead was covered by a perfectly colourless supernatant liquor, which, on being carefully decanted and evaporated *in vacuo*, afforded no crystals, but dried in scales, having the appearance of a kind of varnish, with a very slight tint of yellow.

I used the product thus obtained in my examination for the presence of nitrogen, and also in the analysis with oxide o copper. To distinguish it from the crude aloes I have called it *aloëtine.*

Aloëtine is obtained in the form of nearly colourless scales, if in the process air be as much as possible excluded. It is very soluble in water and in alcohol, little soluble in ether, and completely insoluble in the fixed and essential oils. On calcination in close vessels, a shining voluminous residue is left, which entirely disappears on incineration in the air. The aloëtine is not coloured by either the *per* or *proto* salts of iron; and it gives no precipitate with acetate of lead; in other respects its reactions are similar to those of socotrine aloes.

If the aloëtine be dried in contact with air, the scales, instead of being colourless, will have an intense red colour, due to a slight absorption of oxygen. With the exception of the difference in colour, it undergoes no modification in its chemical properties, and probably analysis would hardly detect any difference between that altered by the contact of air, and that prepared *in vacuo.* The process may therefore be rendered much more easy by drying the product over a water-bath, or by exposure to the heat of the sun, when it is not desired to obtain the aloëtine in a state of absolute purity.

Aloëtine possesses in a high degree the purgative properties and bitter taste of ordinary aloes. For medicinal use eight parts of aloëtine are equivalent to ten parts of socotrine aloes and fifty parts of Cape aloes.—*Ib. from Jour. de Pharm.*

ART. XV.—ON THE SOLUBILITY OF SOME PRECIPITATES WHICH OCCUR IN QUANTITATIVE ANALYSIS.

By R. Fresenius.

I. *Solubility of the Potassio-chloride of Platinum in Alcohol.—No free Muriatic Acid present.—a.* An excess of perfectly pure recently precipitated potassio-chloride of platinum was digested with alcohol of 0.805 spec. grav. for 6 days, at a temperature of 59° to 68°, in a closed flask, with frequent agitation. 72.5 grms. of the perfectly colourless filtered solution, evaporated in a platinum dish, left 0.0060 grm. residue dried at 212°. Accordingly 1 part potassio-chloride of platinum dissolves in 12085 parts of alcohol of 0.805 spec. gravity.

b. The same experiment, made with spirit of 0.873, showed that 1 part of the salt required 3775 parts spirit of this strength for solution.

c. With spirit of 0.923, 1 part of the salt dissolved in 1053 parts.

In the presence of free Muriatic Acid.—Recently precipitated potassio-chloride of platinum was digested in the cold with spirit of 0.873 spec. grav., to which some muriatic acid had been added. 67 grms. of this solution, which was coloured yellowish, left 0.0146 grms. platinum, corresponding to 0.0365 grm. potassio-chloride of platinum; consequently 1 part of the double salt dissolves in 1835 parts of spirit, containing muriatic acid.

II. *Solubility of the Ammonio-chloride of Platinum in Alcohol.—No free Muriatic Acid present.*—The author found 1 part of this salt to require 26535 parts alcohol of 0.805 for solution, 1406 spirit of 0.873, and 665 parts spirit of 0.228.

In the presence of Muriatic Acid.—1 part of the double salt dissolved in 672 parts of acidified spirit of 0.873 spec. grav.

III. *Solubility of the Carbonate of Baryta.*—1 part of the recently precipitated salt dissolves in 14137 parts *cold* water, and 1542 parts *boiling* water.

A solution of chemically pure chloride of barium was treated with an excess of ammonia and carbonate of ammonia, heated gently, and set aside for 12 hours. The filtered solution remained perfectly clear on the addition of sulphuric acid; after standing for a very long time a scarcely perceptible precipitate had separated. 84.82 grms. of the solution, evaporated in a small platinum dish and gently ignited, left 0.0006 residue; consequently 141000 parts of the liquid, containing ammonia and carbonate of ammonia, had dissolved 1 part of the salt.

IV. *Solubility of the Silico-fluoride of Barium.*—1 part of the salt was found to dissolve in 3802 parts *cold* water and 3392 parts water, after being boiled with it, and then allowed to cool. In cold water containing muriatic acid the relation is as 1 part to 783; but on being boiled and then allowed to cool, the relation is as 1 to 640.

V. *Solubility of Sulphate of Strontia.*—In pure water at the ordinary temperature 1 part dissolves in 6895, and in 9638 parts of water at 212°.

In water containing muriatic and sulphuric acid, 1 part requires 11862 parts.

VI. *Solubility of Carbonate of Strontia.*—1 part of the salt requires, according to the author, 18045 parts water for solution; and in water containing ammonia and carbonate of ammonia, 1 part requires 36545 parts for solution.

When a solution of chloride of strontium is precipitated with carbonate of ammonia and ammonia, the filtered solution is not rendered turbid on the addition of alcohol by sulphuric acid.

VII.—*Solubility of Carbonate of Lime in Water.*—1 part of this salt dissolves in 8834 parts *boiling* water, and in 10601 parts *cold* water; and in water containing ammonia and carbonate of ammonia 1 part in 65246 parts.

VIII. *Solubility of pure Magnesia in Water.**—Perfectly pure crystallized sulphate of magnesia was dissolved in water, the solution precipitated with carbonate and caustic ammonia, the precipitate most carefully washed (it still contained nevertheless a perceptible trace of sulphuric acid;) it was dissolved in pure nitric acid, avoiding an excess of acid, again precipitated with carbonate and pure ammonia, and the precipitate most carefully edulcorated. The perfectly pure basic carbonate of magnesia thus obtained was ignited in the platinum crucible until its weight remained constant, then digested with distilled water (which left on evaporation not a trace of fixed residue, and was likewise perfectly free from chlorine) for 24 hours in the cold, being frequently agitated. 1 part of pure magnesia was found, on an average of three experiments, to dissolve in 55368 parts cold water. This solution of magnesia has a faint but distinctly alkaline reaction, which may easily be detected by means of slightly reddened litmus paper; it is not rendered turbid by alkaline carbonates either in the cold or on boiling; it likewise remains clear with phosphate of soda, but if ammonia be added it becomes turbid after slight agitation, and soon deposits a distinct precipitate of basic phosphate of ammonia and magnesia.

Pure magnesia, boiled with water, yields a solution which behaves in every respect like that prepared in the cold.

IX. *Solubility of the Carbonate of Lead.*—The author finds that 1 part requires 50551 parts of pure water at the ordinary temperature for solution; this solution is not in the slightest degree coloured by sulphuretted hydrogen.

In water which contained a little acetate of ammonia, and also carbonate and pure ammonia, 1 part of the salt dissolves 23450 parts; the solution was slightly coloured by

* The very different results formerly obtained are undoubtedly owing to an imperfectly pure magnesia having been employed in the experiments.

sulphuretted hydrogen, and after long standing deposited traces of sulphuret of lead.

Water, containing much nitrate of ammonia besides carbonated and caustic ammonia, dissolves, judging from the colour produced in the filtered solution by sulphuretted hydrogen, somewhat more of this salt than in the preceding experiment.

X. *Solubility of Oxalate of Lead.*—A dilute solution of acetate of lead was precipitated with oxalate of ammonia and ammonia; the liquid filtered from the precipitate after long standing exhibited, on the addition of sulphuretted hydrogen, a faint brownish tint when viewed from above.

XI. *Solubility of Sulphate of Lead.*—1 part of this salt requires 22816 parts of pure water at 52° for solution. In water containing sulphuric acid, 1 part of the salt requires 36504 parts; and in water containing ammoniacal salts and sulphuric acid, no perceptible colour is produced by the addition of sulphuretted hydrogen to the filtered solution.

XII. *Solubility of the Basic Carbonate of Zinc.*—1 part of the salt was found to require 44642 parts water for solution.

XIII. *Solubility of Chloride of Barium in Absolute Alcohol.*—1 part of the salt requires 8108 parts of cold alcohol of 0.795 spec. grav.; and on boiling and then allowing to cool, 1 part dissolves in 6685 parts; but when filtered boiling, 1 part was found to have dissolved in 4857 parts of the boiling alcohol.

XIV. *Solubility of Chloride of Strontium in Alcohol.*—1 part of the salt dissolves in 116.4 parts of cold alcohol of 0.795 spec. grav., and in 262 parts boiling alcohol.—*Chem. Gaz., from Liebig's Annalen.*

ART. XVI.—ON THE CHANGE WHICH TINCTURE OF IODINE UNDERGOES WITH KEEPING.

By M. Guibourt.

Extracted from the Bulletin de l' Academie de Medicine.

I wish to direct the attention of the Académie to the variations which the alcoholic tincture of iodine presents in its constitution and therapeutic effects, according to the length of time which has elapsed since its preparation.

I will commence by taking a retrospect of the use of iodine since Coindet proposed it as a remedy for goitre. The alcoholic tincture was at that time prescribed in doses of four, six, or eight drops two or three times a day, in some aqueous liquid. But the iodine is precipitated on adding the tincture to water, the solid particles of iodine being held in suspension in the liquid; and these being deposited on the coats of the stomach, caused active irritation, and probably small local ulcerations. Thus it was found that persons attacked with goitre, but who in other respects were in good health, after commencing the tincture of iodine, experienced pains in the stomach, loss of appetite, bad digestion, and wasting, which gave rise to the opinion, prevalent at that time, that iodine could not be used for reducing goitre, without its producing, at the same time, a general emaciation; that it diminished, in particular, the breasts; and that when prescribed for young females, it retarded the development of those organs designed for them by nature. Coindet, with the view of obviating these objections to the remedy, substituted for the alcoholic tincture, a solution of iodine in iodide of potassium, which giving no precipitation of iodine when added to water, acted as a mild and uniform stimulant to the stomach, and thus improved the digestive functions. Thus from that time, not only have all the objections which were previously urged against the use of iodine ceased to exist, but on the other hand, it has been found, that weak and debilitated patients improved in appetite and condition, and young females acquired improved colour, increased developement of the breasts, and regularity of the natural economy, in proof of the beneficial action of the medicine. I have taken a review of these circumstances, which must be in the recollection of most medical men, in order to establish the great difference which exists between the action of iodine when administered in the solid state, and in the state of perfect solution. I now pass to the examination of the mixture employed by M. Velpeau in the treatment of hydrocele.

I will first consider the case of tincture of iodine recently prepared, such as that which I present to the Academy, which was made three days ago, according to the directions of the Codex, by dissolving, without heat, one part of iodine in twelve parts of spirit, sp. gr. .848. If this tincture be mixed with twice its weight of water, the iodine will be almost entirely precipitated in the form of black particles, easily separating by repose, and the supernatant liquid will be almost colourless. In what way should this liquid be taken? If the clear and transparent part only be taken, it would probably produce only a slight stimulating effect, due principally to the spirit. If, on the other hand, the liquid be shaken up before taking it, the solid particles of iodine would be deposited on the coats of the intestinal canal, and would produce a degree of irritation that may not be free from danger.

I will now consider the case of tincture of iodine which has been prepared four or five months. The following is the change which has taken place during this interval of time. One part of the iodine takes hydrogen from the alcohol to form hydriodic acid, which unites with another portion of iodine to form ioduretted hydriodic acid, which gives no precipitate with water. On the other hand, the alcohol probably replaces the lost hydrogen by iodine, forming another compound not precipitated by water. It is found, therefore, on mixing this tincture, four or five months old, with twice its weight of water, that there still is a precipitation of iodine, but that the precipitate is three or four times less in quantity than that afforded by the recently made tincture. The supernatant liquor, in this case, however, will be much more highly coloured than in the other, and it is unquestionable that the effect of the mixture, whether it be given clear or with the precipitate, would be different from those of a similar mixture made with the recently prepared tincture.

Lastly, if we take tincture of iodine that has been prepared for a year or a year and a half, it will scarcely cause any precipitation with water, and its medicinal effects will be different from those of the tincture in either of the cases previously considered.

I conclude from these facts, to which I have long had my attention directed, that the alcoholic tincture of iodine is a medicine liable to variations in its composition and in its effects, and that it ought to be replaced by a somewhat similar mixture, which should be made extemporaneously. Such, for example, as the following, in which the whole of the iodine would remain in solution, forming a homogenous mixture:

℞ Iodine, 5 parts.
Iodide of potassium, 6 parts.
Rectified spirit, 50 parts.
Distilled water, 100 parts.

Triturate the iodine, iodide of potassium and part of the water in a mortar; then add the spirit, and the remainder of the water.—*Pharm. Jour., from Journ. de Pharm.*

ART. XVII.—ON ACHILLEÏNE AND ACHILLEÏC ACID.

By B. Zanon.

M. Zanon obtains the active principle of this plant,[*] which is used in the south of Europe as a substitute for sulphate of quinine in intermittent fevers, by boiling 2,000 grammes of the dried plant with 16 lbs. of rain water for about two hours. The residue is again boiled twice with smaller quantities of water, and the filtered solutions are mixed. These are then clarified with white of egg, and evaporated at a gentle heat until a whitish pellicle is formed on the surface. After twenty-four hours the cold liquid deposits a mass, consisting for the most part of vegetable fibre, green coloring substance, with some coagulated albumen, extractive matter insoluble in alcohol, lime salts, and traces of silica. The filtered bitter and acid liquid is treated with an excess of hydrate of lime, which produces a white precipitate; upon this the liquid is treated with acetate of lead as long as any precipitate is formed. This is collected on a filter, and the solution saturated with sulphuretted hydrogen, after which it still possesses a yellowish colour and a very bitter taste. On evaporation it yields nearly 150 grammes of dry extract, which, as well as the previously filtered sulphuret of lead, are exhausted with alcohol. The two, mixed and evaporated, yield 130 grammes extract, which the author calls achilleïne. As the author found that substance thus obtained still contained some acetate of lime, resin, &c., he modified the above process, and treated the neutralized decoction with animal charcoal, evaporated to dryness, and extracted with boiling absolute alcohol. In this way the formation of acetate of lime was avoided and time saved. Achilleïne can be freed from the slight trace of resin by solution in water. The colour of achilleïne is instantly destroyed by chlorine; it is not precipitated by tincture of galls nor acetate of lead, but it is thrown down by basic acetate of lead; it is soluble in ammonia, and the solution, when exposed to the air until the ammoniacal odour has disappeared, deposits brown flakes, which are less soluble than achilleïne. From all its properties it should undoubtedly be ranked with the bitter extractive substances.

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[*] Achillea millifolium—Yarrow.

To obtain the acid to which the decoction of the yarrow owes its acid reaction, the author treated it with acetate of lead as long as a precipitate resulted, and this was suspended in water and decomposed with sulphuretted hydrogen. The liquid obtained was very acid, and still contained some green coloring substance and lime; it was, therefore, supersaturated with carbonate of potassa (which precipitated the lime) and then treated with animal charcoal. The potassa-salt was precipitated with acetate of lead, and the precipitate decomposed with sulphuretted hydrogen.

Achilleïc acid is not volatile at 212° F.; its solution can therefore be concentrated by evaporation in the water-bath. The greatest concentration to which it can be brought is 1.014825. In this state it is perfectly colorless, but on further evaporation it becomes straw-colored. Exposed to the air in a glass or porcelain dish, it crystallizes in perfectly colorless quadrilateral prisms. The crystallised acid requires at 56° F. two parts of cold water for solution; the solution is very acid, makes the teeth rough, has no odour, and strongly reddens litmus paper Added by drops to a clear solution of acetate of lead, it it does not render it in the least turbid; but in a solution of basic acetate of lead it immediately produces a white precipitate, which is very slightly soluble.

Achilleäte of potassa is obtained when the acid, diluted with only a little water, is poured into a solution of carbonate of potassa, so as to neutralize it; the liquid is then filtered, evaporated, and set aside to crystallize. This salt separates in very minute prisms, which can only be seen with a microscope; it has a saline taste, which resembles that of chloride of sodium, it is less soluble in alcohol than in water; exposed to the air it is not altered, but its mother-ley acquires under the same conditions a yellowish tint.

Achilleäte of soda is prepared with carbonate of soda in the same manner as the potassa salt. The taste of this salt very much resembles that of the preceding, as also its solubility in water and alcohol, but its crystalline form is very distinct from that of the potassa salt; a clear concentrated aqueous solution yielded very beautiful rhombic crystals, which could be perceived with the naked eye.

Achilleäte of ammonia may be prepared by mixing achilleïc acid with ammonia; the liquid becomes pale yellow when evaporated to a syrup. By exposure to the air for several days it slowly evaporates to a saline mass, which has a similar taste to the potassa and soda salts. It is soluble in water and insoluble in pure alcohol.

Achilleäte of lime crystallises in irregular scales or needles: it is obtained when lime is treated for some hours with slightly diluted achilleïc acid, filtered and set apart to crystallize; it is insoluble in absolute alcohol.

Achilleäte of magnesia is difficult to obtain in the crystalline form: when its solution is allowed to evaporate in the air, a yellowish, solid, transparent, gummy mass, more soluble in water than in alcohol, is obtained. It is prepared in the same way as the salt of lime.

Achilleäte of quinine.—Quinine dissolves in slightly diluted achilleïc acid by allowing the substances to act for several days on each other, stirring them frequently until the liquid no longer reddens litmus-paper. Upon this it is filtered, and some alcohol added; it is heated nearly to boiling, and allowed to cool. Nearly the whole liquid is converted into very beautiful radiate-grouped prismatic crystals. The salt has a very bitter taste, and is readily soluble in water and alcohol. On account of its great solubility, the author considers that it will be found better adapted than sulphate of quinine for medical purposes.—*Chemist, from Liebig's Annalin.*

ART. XVIII.—EFFECT OF MATICO-LEAF IN A CASE OF OBSTINATE HÆMORRHAGE.

The patient was a boy between four and five years old, who, in falling had bit his tongue, the consequence of which was an oozing of blood which, when the child was brought to Mr. Hamilton, had continued for two days, to the great alarm of his family, as his brother had died from hæmorrhage occasioned by a slight injury of the nose, and the boy himself had before nearly bled to death from some slight wound about the mouth. Actual cautery first, and then a ligature, applied by means of a sewing needle, had each but a temporary effect, and finally the hæmorrhage was stopped by persuading the child to keep sucking a piece of alum for an hour or two. It was long before the child recovered his strength.

The child was brought a second time to Mr. Hamilton, having again bit his tongue three days before, during which time a continual oozing of blood had gone on, causing a perfectly blanched appearance, notwithstanding that nitrate of silver had been applied, and a piece of alum had been sucked as before. After in vain trying pressure, Mr. Hamilton took a piece of matico-leaf (Piper angustifolium) and applied the lower surface to the bleeding point, and retaining it there as long as the child would keep the tongue quiet, which was not half a minute. He then found that the blood had ceased to flow, and that the small spangle of matico-leaf adhered to the tongue. It fell off in half an hour, when there was scarcely any appearance of bleeding; a second piece was applied, and the hæmorrhage completely stopped.—*Ibid, from Dublin Hospital Gazette.*

ART. XIX.—THE TANNATE OF IRON IN THE TREATMENT OF CHLOROSIS.

By Benedetti.

This substance, according to our author, excels all other medicines in the treatment of chlorosis. In evidence of this he cites cases from his own, and from the practice of Majocchi, affirming that the treatment by the tannate of iron is successful in from twelve to twenty-five days, according to the severity of the case. It is to be administered in doses of from eight to thirty grains in the day. It acts more rapidly in persons of sanguine temperament. The mode of preparation, as described by M. V. Gaddi, is as follows:—A very pure sulphate of iron is made by the action of dilute sulphuric acid on iron filings; from this sulphate, by means of carbonate of soda, a carbonate of iron is precipitated, which is washed several times, and then dried on the stove. It is now pulverized and thrown by small portions at a time into a boiling solution of very pure tannic acid in a porcelain vessel—the proportions used being very nearly five parts of the carbonate to one of the acid—or 440 parts of the carbonate to 90 of the tannic acid. The fluid is to be stirred constantly till the effervescence ceases. It is afterwards exposed to a heat equal to the boiling point of water, till it acquires the consistence of thick soup. It is then withdrawn from the fire and poured on porcelain plates, and dried with the assistance of heat. The tannate of iron thus obtained is of a crimson color, insipid, insoluble, uncrystallized, though before being dried it appears in long needles. It may be administered either suspended in syrup, or still more conveniently in the form of pills.

ART. XX.—ALTERATION EXPERIENCED BY THE HYDRATED OXIDE OF IRON UNDER WATER.

BY DR. G. C. WITTSTEIN.

A SOLUTION of sulphate or hydrochlorate of iron yields with ammonia a very voluminous flushy brownish-red precipitate of Fe^2O^3+3HO, easily soluble in cold acetic acid. These facts are well known; but it is scarcely, if at all, known that a similar precipitate, which has been allowed to remain some time under water, and, consequently, which has never been dried, loses entirely, or in great measure, its power of solution in acetic acid, just as though it had been dried. Other organic acids, moreover, which, under ordinary circumstances, dissolve undried oxide of iron with great facility, as, for example, tartaric and citric acids, take up a much less quantity of oxide thus prepared. I have already remarked in this journal, vol. 92, sec. 290, the circumstance alluded to, having found that in the preparation of citrate of oxide of iron the freshly prepared oxide was necessary to the effect. Since that period I have investigated the cause of this peculiar behaviour, and with a fortunate result.

If a portion of the precipitate recently thrown down be washed, and then examined microscopically, no trace of crystalline structure, properly so called, is observable, the particles consisting merely of little amorphous bodies. If, however, a portion of the oxide which has been allowed to remain under water be examined, it is found to be crystalline throughout. The little crystals are of a dark yellow colour, and moderately transparent. How long a period of aqueous submersion is necessary to effect this crystalline change I am unable to say—my crystalline deposit, which I microscopically examined, was more than two years old; it is, however, exceedingly probable that the peculiar change alluded to occurs much sooner, because I remember that a portion of oxide which had been allowed to remain half a year under water, presented an alteration of external appearance, having become more compact.

Not only does this alteration of microscopic structure take place amongst the particles, but the more insoluble compound only contains half the original quantity of water, its formula being $2Fe^2O^3+3HO$. Consequently the diminished solubility of the altered oxide depends on two causes—its altered constitution in regard to water of combination, and its altered microscopic condition.

Perhaps it is not an indifferent matter whether as an antidote for arsenious acid the hydrated oxide have been long standing under water or the contrary; at any rate, of two preparations of this oxide the more recent should have the preference; and it would be prudent to recommend that the store of hydrated oxide should be renewed every half year. The old preparation having given place to the new should not be thrown away, but redissolved in hydrochloric acid, and again precipitated by ammonia, when its original properties are renewed.—*Chemist, from Buchner's Repertorium.*

NOTE.—The reader is referred to page 29, vol. 14th of this Journal. In the article referred, to the results obtained now by Dr. Wittstein were then arrived at, and under similar circumstances. The summary of that paper says—"That hydrated peroxide of iron, even when kept under water, gradually decreases in its power of neutralizing arsenious acid," and "that this decrease in power is probably due to a change in the relative *proportion of the oxide, and the water chemically combined with it*, as well as to an *alteration in its state of aggregation*." The microscopic observation of Dr. Wittstein in reference to this change is corroborative of that statement. W. P., JR.

ART. XXI.—ON A NEW PREPARATION OF IODINE.—SYRUP OF IODIDE AND CHLORIDE OF IRON.

By Samuel Battley.

As iodine is at present so extensively employed, and maintains so high a character as a remedial agent, it appears rather singular that some of its most efficient combinations are still so little used. Amongst these the iodide of iron is one which has not yet attained that rank in professional estimation that its merits claim. This seems in part owing to the process by which the London Pharmacopœia directs it to be prepared, its great tendency to decomposition, and the difficulty of its preservation. The iron possesses a greater affinity for the oxygen of the atmosphere than for iodine, in consequence of which the latter is set free, and when the preparation is exhibited in such a state, the stomach is frequently incapable of bearing what might otherwise prove a valuable tonic. This tendency to oxidation in the iron, and liberation of free iodine, is indeed prevented by using the syrup, the sugar in which has the property of preventing protoxides, protiodides, and protochlorides, from absorbing oxygen, and passing into peroxide, in which state iron exerts but little action on the system.

Practical men, however, have remarked, that the iodide of iron, even when given in the best form, has sometimes failed to produce that speedy and decisive chalybeate influence on the system that other salts do, though in other respects an agreeable and elegant form. This observation is readily explained on reference to the constitution of the salt, in which the amount of iron is less than one-fourth of that of the iodine, the combining proportion of the former being 28, while that of the latter is 126. As iodine is incapable of entering into combination with a greater proportion of iron, in order to increase the quantity we may substitute another salt of iron, isomorphous in its crystal, and analogous in constitution to the protochloride. These two salts may be mixed in any proportion without decomposition, and thus present an elegant and powerful preparation of iron, while the iodine, by its action on the glandular system and secretory apparatus, tends to prevent that cerebral plethora which the salts of iron, when given *per se*, so frequently induce.

The syrup of the iodide and chloride of iron, which it is the object of the preceding remarks to introduce to the notice of the profession, is prepared by first forming a solution of iodide of iron. This is effected by diffusing iodine in three or four times its weight of cold distilled water, and agitating for ten minutes with half the quantity of iron filings, added cautiously and gradually, when the colour changes from dark purple to a deep green, as combination takes place. The protochloride of iron is next formed, by acting upon iron filings with hydrochloric acid, specific gravity, 1.160. A copious disengagement of hydrogen gas ensues, and continues for several hours, during which the chlorine combines with one equivalent of iron, the fluid becomes neutral to test paper, and we obtain a solution of a green colour, also with a shade of blue. The two solutions are now mixed together, and so much refined sugar added as will form a syrup.

The syrup ought to be of a pale green, representing the protosalts of iron. The proportion of the salts in solution are so adjusted, that each fluid drachm of the syrup contains three grains of combined iodine and nearly four grains of iron, united partly with the iodine and partly with the chlorine. The following formula may afford an eligible mode of exhibition:—Syrup of iodide and chloride of iron, two drachms; syrup of orange-peel, four drachms; infusion of cascarilla, four ounces. Mix for four draughts, one to be taken twice daily.

The syrup of iodide of iron, and syrup of chloride of iron, may be made and kept separately, when they can be mixed in any proportion, according to the amount of iron or iodine the practioner may wish to administer.—*Chem. from Lan.*

NOTE.—The author has not been sufficiently explicit. The following formula may be used by those desirous of making the preparation :

℞	Iodine, - - - -	384 grains, Troy
	Hydrochloric acid, sp. gr. 1.16	4¼ ounces, "
	Sugar, in powder, - -	12 " "
	Iron filings	
	Water, of each a sufficient quantity.	

Mix the Hydrochloric acid with an ounce and a half of iron filings, free from oxide, and allow it to stand, with occasional agitation, until the acid is neutrallized, then filter. Next mix the iodine with three ounces of water in a flask, add half its weight of iron filings, agitate until all the iodine is combined, and filter also. Finally, mix the two solutions, add the sugar, and as much water as will make the whole measure a pint. The pure sugar is readily dissolved by agitation without heat.

The resulting syrup contains 29 grs. of protodide and 72 grs. of protochloride of iron in each fluid ounce, and each fluid dram 3 grs. of iodine and 4 of iron.

W. P., JR.

ART. XXII.—ON THE EFFICACY OF PYRO-ACETIC SPIRIT IN GOUT AND RHEUMATISM.

BY JOHN HASTINGS, M. D.

IT is nearly four years since I called the attention of the profession to the remedial powers of pyro-acetic spirit, or medicinal naptha, in phthisis. It occasioned a great deal of discussion at that period, and many who questioned its value then have since acknowledged the truth of my views; nd I believe many more would have done so, but unfortunately the symptoms of early phthisis are not sufficiently precise to satisfy the minds of those disposed to be sceptical. The opinions I then advanced, I have had frequent opportunities of confirming.

However, it is gratifying to perceive that it is attracting attention on the other side of the channel; and I also find that a book has been recently published by Renshaw, written by an M. R. C. S., on the treatment of this disease, in which pyro-acetic spirit is put forth as the great curative agent; but this is without a single mention of my name in its pages.

I have now to deal with another class of diseases, about the diagnosis of which there is no room for either cavil or doubt: I mean, gout, acute and chronic rheumatism. For upwards of twelve months I have employed pyro-acetic spirit in these affections, and my treatment has been attended with a success quite extraordinary, far exceeding the results usually obtained by colchicum, &c. I have not yet seen a case of gout or acute rheumatism which has not rapidly disappeared under its use, at the same time that it brings about a very improved condition of the general health. Chronic rheumatism requires a more lengthened treatment for its removal; indeed, it has less power over this affection than the two preceding.

I should have forwarded a report of cases, with further observations on this treatment, but from my conviction of it value, I thought it better to make this general statement, and also to assert my claim to having been the first to employ this agent in a class of diseases hitherto so intractible, and defer the other for a future occasion.—*Chemist, from Lancet.*

ART. XXIII.—OBSERVATIONS ON NICOTINE, WITH A DESCRIPTION OF A METHOD FOR DETERMINING ITS AMOUNT IN LEAF AND MANUFACTURED TOBACCO.

By M. Schloessing.

The following is the most advantageous method for preparing nicotine. Tobacco is treated with water, and the solution concentrated; the extract is dissolved in alcohol, which after decantation is likewise concentrated; this last extract is now treated with potash, then agitated with æther, which dissolves the nicotine and also some foreign substances, which are got rid of by precipitating the alkaloid in the state of oxalate. This precipitate is washed by agitating it with æther, then treated with potash, again dissolved in æther, and submitted to distillation. The residue of the distillation is coloured but limpid, and contains, besides nicotine, water, æther and ammonia; a temperature of 284° maintained for 12 hours, and assisted by a current of dry hydrogen, suffices to expel these three bodies, so that the nicotine passes pure and colourless, when the temperature is subsequently raised to 356°. 2 lbs. of good tobacco, grown in the department of Lot, is capable of yielding by this process from 50 to 60 grms. of nicotine.

The formula for nicotine, $C^{20} H^{14} N^{2}$, proposed by M. Melsens, is confirmed by my analyses; its equivalent, 1012.5, appears however to require doubling, for an equivalent of sulphuric acid neutralizes twice 1012.5; and nicotine is a powerful base, which precipitates the oxides of manganese, iron, and silver; it is therefore not very probable that its sulphate, which is neutral towards litmus paper, is in reality a subsulphate. The above view is also confirmed by the following fact:—If some nicotine is placed in a solution of a salt of lime or baryta, and an excess of carbonic acid passed into the solution, 1 equiv. of carbonate of lime or baryta is precipitated for every 2025 of nicotine.

Nicotine must exist in the tobacco in the state of a salt; for the aqueous, alcoholic and æthereal solutions of this plant behave precisely as if they contained a salt of nicotine. Nicotine absorbs moisture from the atmosphere, but it may be completely deprived of water, æther, and ammonia by placing it over mercury in a bell glass full of hydrogen, by the side of a capsule containing concentrated sulphuric acid.

The amount of nicotine in leaf or manufactured tobacco may be accurately ascertained by a simple and easy process. 10 grms. of tobacco are exhausted with ammoniacal æther in a continuous distillatory apparatus, the ammoniacal gas expelled from the nicotine solution by boiling, then decanted, and, after evaporation of the æther, neutralized with a solution of sulphuric acid of known strength. This process will be applicable, with some slight modifications, to most of the organic alkalies. Its accuracy was proved by ascertaining,—1st, that the displacement of the nicotine by ammonia and the exhaustion by the æther are perfect; 2d, that merely boiling the solution of nicotine suffices to expel the ammoniacal gas dissolved; 3rd, that during this boiling no nicotine is lost; 4th, that a proportionality is found between different weights of nicotine, and the quantities of normal liquid required for their neutralization; 5th, that there is no other substance besides the nicotine capable of absorbing the acid; 6th, that if the tobacco contained any other bases than nicotine, they would not interfere; lastly, nearly the whole of the nicotine contained in 10 grms. of Lot tobacco was extracted, purified, weighed and analysed; the weight was 0.766, and should have been, according to the test with the normal solution, 0.796.

The following amounts of nicotine were indicated by testing in this manner various French and American tobaccos:

Lot,	7.96	per cent	of the dried	tobacco.
Lot et Garonne,	7.34	"	"	"
Nord,	6.58	"	"	"
Ile et Vilaine,	6.29	"	"	"
Pas de Calais,	4.94	"	"	"
Alsatia,	3.21	"	"	"
Virginia,	6.87	"	"	"
Kentucky,	6.09	"	"	"
Maryland,	2.29	"	"	"
Havanna, less than	2.00	"	"	"

It will be seen from this table that those tobaccos which contain the most nicotine are also the best suited for the manufacture of snuff.

The above method of determining the amount of nicotine applied to snuff indicated as a mean 2.04 nicotine per cent. of the dried powder; whence it is concluded that about two-thirds of the nicotine contained in the mixed leaves destined for the manufacture of snuff is destroyed by the fermentation. The ammonia exists in the snuff in the state of a salt; the nicotine, partly in a free state, and partly as a neutral salt, or altogether in the state of a subsalt. It is to these two salts that snuff owes its property of exciting the mucous membrane of the nose.

This memoir is the first part of an investigation on the composition of tobacco leaves and on the fermentation of tobacco, begun in the laboratory of the *Manufacture des Tabacs*, under the direction of Mr. Fremy.—*Chem. Gaz., from Comptes Rendus.*

ART. XXIV.—RELATION BETWEEN NITRIFICATION AND THE FERTILIZATION OF SOILS.

By F. KUHLMANN.

ANIMAL substances exert their salutary influence upon vegetation only when by their decomposition there is a development of carbonate of ammonia. I have adopted the same view for the nitrates employed as manures; I have generally regarded their influence to be effectual only when, by the deoxidizing action of putrid fermentation, their acid is converted into ammonia. To show that this conversion was probable, I was led to examine whether, in operating upon liquid products, it would be possible to obtain results analogous to those arrived at in 1838, with the aid of spongy platinum, in acting upon mixtures of gases or vapours. In the same year I showed that the production of ammonia, by the action of weak nitric acid upon tin, was not an isolated fact, but that it resulted from the action of this acid upon all the metals capable of decomposing water, and consequently the ordinary result of the contact of nascent hydrogen with nitric acid. MM. Fordos and Gelis have confirmed the correctness of my results, to which they have added several other facts, especially that of the decomposition of sulphurous acid by the action of nascent hydrogen.

The following are the results of some further experiments in support of the conversion of the nitrates into ammoniacal salts. When some fragments of nitre are thrown into a mixture of zinc or iron and sulphuric acid, or, what is preferable, weak hydrochloric acid, the disengagement of hydrogen is stopped or retarded until the whole of the nitric acid of the nitrate is converted into ammonia.

Nascent sulphuretted hydrogen occasions a similar conversion, at the same time depositing sulphur.

When a nitrate, the metal of which is precipitated by zinc, nitrate of copper for instance, is placed in presence of a mixture of zinc and hydrochloric acid, for every equivalent of zinc dissolved there is one equiv. of copper precipitated, and one equiv. of the nitric acid of the nitrate is converted into one equiv. of ammonia, the whole without any liberation of hydrogen.

By passing a current of sulphuretted hydrogen through a solution of chloride of antimony mixed with a nitrate, the acid of this latter is converted into ammonia. Similar metamorphoses are effected by the contact of nitrates with a solution of sulphuret of arsenic in potash, or with the hydrated protoxides of tin and iron.

I think that, after the announcement of these facts, no doubt can remain relative to the decomposition which the nitrates experience in the soil under the influence of putrid fermentation. It is known that this fermentation, considered as a deoxidizing agent, is capable of overcoming the strongest affinities.

If the fertilizing agent must be presented to the plant principally, if not exclusively, in the state of carbonate of ammonia, serious inconveniences arise from the volatile nature of this salt: for it is no sooner confided to the soil to fertilize it, than a large portion is removed by the air to be diffused over the earth.

We have now to examine what influence nitrification has upon vegetation. It is conceivable that the mode of fertilization by the ammonia of the atmosphere may suffice for certain countries, and not for others; the more we approach the meridional countries, the less necessity is there for manures.

If I entertain the conviction that the nitrates do not act generally as fertilizers, except after having experienced, at a certain depth in the soil, a decomposition which yields carbonate of ammonia, I am not the less satisfied that the fertility of the soils likewise depends on an inverse reaction, which is opposed to the volatilization of the ammonia; I mean the conversion of ammoniacal salts into nitrates, which occurs in the superficial portions of those soils which present a suitable chemical composition, and are placed under the most favourable conditions of moisture and temperature.

With respect to the conversion of ammonia into nitric acid, I proved satisfactorily in 1838 that this furnishes the most simple and conclusive explanation of the formation of the nitre beds. My opinions on this subject are at present admitted by the majority of chemists; but if any doubt should still exist, the following results will suffice to remove them. When a mixture of bichromate of potash, concentrated sulphuric acid and sulphate of ammonia is heated in a retort, a large quantity of nitric acid distils over. On heating a mixture of peroxide of manganese or peroxide of lead or minium and weak sulphuric acid in the presence of sulphate of ammonia, the ammonia of the sulphate is equally converted into nitric acid, which passes over.

In investigating the conversion of ammoniacal gas into nitric acid by its contact at a high temperature with the peroxide of manganese, I found that we possessed in this oxide a valuable agent for transferring *indefinitely* the oxygen of the atmosphere to the ammonia. MnO^2 by a first oxidation passes into the state of MnO, which the contact of air immediately converts into $Mn^3 O^4$, which is again susceptible of oxidizing the ammonia.

If we now compare the slow progress of nitrification in the northern provinces with the rapidity with which it results in meridional countries, it will be conceived how much greater the expense in ammonia or in nitrogenous manures must be in the north than in the south.

The Academy will probably attach some interest to the result of the experiments I have made in support of my opinion respecting the influence of nitrification upon the fertilization of soils; it will perhaps also recognise that the facility with which I have succeeded in converting ammonia into nitric acid will serve, in case of any future continental blockade, to render Europe more independent of India and Chili in regard to its supplies of nitrates or nitric acid; that, under other circumstances, by an inverse reaction, we shall find in the nitrates of India and Chili abundant sources of ammonia, turning to advantage the hydrogen, and especially the sulphuretted hydrogen, which at present is lost in many operations of the arts, and moreover proves of considerable injury to the public health.

In conclusion, I may mention that the various reactions, the results of which are noticed in this article, have led me to the two following applications:—1st, I have based a new process for determining the amount of nitric acid and for the analysis of the nitrates, upon the property of these bodies of being entirely converted into ammonia or into ammoniacal salts under the influence of nascent hydrogen; 2d, by submitting to the action of nascent hydrogen various binary or saline combinations of metals, I have completely reduced a large number of these insoluble or sparingly soluble compounds in weak acids.

By operating upon native crystalline compounds, such as zigueline, azurite, malachite, carbonate of lead, oxide of tin, &c., the metal obtained preserves the crystalline form of the combination in which it existed.—*Ibid, from Comptes Rendus.*

MISCELLANY.

Some Experiments on Assafœtida. By H. Reinsch.—An ounce of finely pulverized assafœtida was mixed with an equal weight of hydrate of lime, and then stirred into a thin paste with a sufficient quantity of water. On submitting this to distillation, a colourless oil passed over with the water, and at the same time some ammonia was disengaged. The oil possessed a burning taste, and an odour differing from that of assafœtida. The residue in the retort was collected on a filter, and washed with hot water until this passed through colourless. A portion of the filtered solution was supersaturated with dilute sulphuric acid, when some brown flakes separated, which united on warming to brown drops, while upon the surface of the liquid some oil collected. On distilling this mixture, some traces of sulphuretted hydrogen, a slightly acid water, and some drops of oil passed over. Neither valerianic nor angelicic acid could be detected in it. The residue left in the retort was brittle, dissolved readily in ammonia, æther and alcohol, from which it separated as a grayish powder. The alcoholic solution of the resin has a faintly acid reaction. When heated on platinum it melts, and then burns with a bright flame; heated in a glass tube, it disengages white vapours, and subsequently drops of a green oil; at the same time the odour of horse-radish is perceptible. Concentrated sulphuric acid dissolves it with a brown colour, from which it is precipitated by water. Precipitated from the lime solution by muriatic acid, the resin forms a greenish powder, which does not cohere, but in its other properties it agrees with that precipitated with sulphuric acid. When the lime residue with which the assafœtida has been treated is exhausted with spirit, a yellow tincture is obtained, which has the taste of assafœtida, but is not bitter like the above resin. If the tincture be mixed with an acid, a resin separates, which possesses the peculiar odour of assafœtida.—*Chem. Gaz. from Jahrb. fur Prakt. Pharm.*

Observations on Glycerine. By F. Rochleder.—The fats are, as is well known, decomposed by the action of strong bases or acids into a fatty acid and glycerine. The following is a new method of preparing glycerine:—When castor oil is dissolved in absolute alcohol, and a current of dry muriatic gas passed through the warm liquid, the fat is decomposed. If, when the muriatic acid gas has acted sufficiently long, the liquid be shaken with water, an emulsion is obtained, which soon separates into an oily supernatant, and into a strong acid aqueous layer. The latter was separated from the layer of oil by means of a siphon, and evaporated in a platinum dish in the water-bath. At first a large quantity of muriatic acid passes off, and there finally remains a yellow syrupy mass. When this is treated with æther, a portion dissolves, while the remainder is not acted upon by the æther. After the evaporation of the æther an oily substance remains, which consists of the combinations of the fatty acids of the castor oil with oxide of ethyle; the substance insoluble in æther forms, after drying *in vacuo*, a slightly yellowish syrup, which has all the properties of glycerine. The oxide of glyceryle of the fats contained in the castor oil has consequently been replaced by oxide of ethyle, while it has combined with the water which the alcohol parted with on its conversion into æther.—*Ibid, from Liebig's Annalen.*

Mode of ascertaining whether Olive Oil has been sophisticated with Rape or Poppy Oil. By M. DIESEL.—Pure olive oil is coloured green by ordinary nitric acid. On the other hand, 1 drm. of olive oil, sophisticated with rape oil and mixed with 12 drops of nitric acid, exhibited a strong yellowish-gray colour. Comparative experiments with various mixtures of oil showed that this reaction was still perceptible even with the addition of one-tenth. The adulteration with poppy oil is likewise easily detected with nitric acid, but the mixture then becomes yellowish-white, and not brownish as in the previous case. Pure nitric acid exhibits the reaction in a far less degree. Dr. Bley adds, that the samples must be judged of in the course of 12 hours after the addition of the nitric acid, as pure olive oil is likewise coloured more or less brown after a longer interval.—*Ibid, from Archiv. der Pharm.*

Test for Strychnia. By MACK.—Marchand has shown in the *Journal de Pharmacie et de Chimie* (1843, Sept., p. 200) that when strychnia is rubbed with peroxide of lead and sulphuric acid containing some nitric acid, it is immediately oxidized and a blue pigment formed, which becomes violet, then gradually red, and, after a few hours, yellow. This test is so delicate that $\frac{1}{1000}$th of a grain of strychnia can be discovered by it. But as peroxide of lead is not usually found in chemists' shops, Mack substituted peroxide of manganese, and obtained similar results. With this test strychnia can be detected in powdered nux vomica. If diluted nitric acid be applied to the powder or to strychnia, and to these be added some finely powdered oxide of manganese and afterwards a few drops of oil of vitriol, a dark-blue colour is instantaneously produced; but it soon changes to violet, then to pink, and at last to yellow. On heating the mixture the phenomena occur much more rapidly. With brucia, morphia, narcotina, and quina no change was produced; and with strychnia, the blue, violet, and red-colours could not be produced when chlorate of potash was substituted for peroxide of manganese; because, probably, the chlorine effects other changes in the organic matter, not oxidizing, but rather dehydrogenizing it.—*Pharm. Jour. from Buchner's Repertorium.*

Test for Strychnine.—Instead of the brown peroxide of lead, Prof. Otto recommends a *very minute* quantity of a solution of chromate of potash. This immediately produces, when added to the solution of the strychnine in concentrated sulphuric acid, the splendid violet colour, which is far more distinct and beautiful than on the addition of the brown peroxide of lead.—*Chem. Gaz.*

On the formation of Lactic Acid. By H. Wackenroder.—The author had previously announced that he had succeeded in converting sugar of milk into lactic acid by means of vegetable albumen; he returns to the subject in the present notice, in which he also describes the use of animal albumen for the same purpose. The conversion of milk sugar by other proteine compounds than caseine is interesting in many respects; but this question would acquire far more importance were it to change into certainty the presumption that every kind of sugar is susceptible of being converted in the same manner into lactic acid, and that this acid is generated whenever the alcoholic fermentation of the sugar or the conversion of the gum, principally of the dextrine; has failed. The author thinks that the free acid of beer, which is generally considered to be malic acid, is lactic acid; and according to the researches in which he is at present engaged, this acid not only occurs in the beers which have done fermenting, but the fresh wash, and even the malt itself, contains a certain quantity.

To ascertain the action of vegetable albumen on milk sugar, the juice of several plants separated from the chlorophylle was placed in contact for several weeks with milk sugar, and some powdered carbonate of lime, at a temperature of about 68° F., stirring it frequently. In all these experiments lactate of lime was obtained, which was very easily purified.

The resemblance of animal albumen to vegetable albumen induced the author to employ also the former, in order to effect the metamorphosis of the milk sugar; he first took the white of a fresh egg, dissolved it in distilled water, and followed the process described above, but the sugar underwent no alteration. He then placed the coagulated white of egg for some weeks in contact with water, and when it had become acid he added to it some milk sugar and carbonate of lime. After standing for six weeks in a warm chamber, the greater portion of the milk sugar had changed into lactic acid, and very beautiful groups of crystals of lactate of lime were obtained from it. M. Wackenroder concludes from these experiments that the albumen of the white of egg is not able to convert the milk sugar into lactic acid until after its coagulation and passage into acid fermentation; and that the negative result, obtained with the fresh white of egg, should probably be attributed to its alkalinity.—*Chem. Gaz., from Archiv. der Pharm.*

On the Composition of Sugar of Gelatine. By A. Laurent.—The author has examined some sugar of gelatine in very beautiful crystals, and found 32.10 per cent. C, 6.66 H, 18.92 N, whence he deduces the formula $C^4 H^5 NO^4$; this gives $C = 32.0$, $= H\ 6.66$, $N = 18.66$, $O = 42.68$. According to this, sugar of gelatine would be isomeric with urethylane. When 1 equiv. water is added to hippuric acid, we obtain $C^{18}H^9 NO^6 + HO = C^{14}H^6 O^4 + C^4 H^5 NO^4$.—*Ib. from Comptes Rendus.*

On the Composition of the Oil of Ben.—By P. Walter.—The oil of ben does not yield, on saponification, any volatile fat acid, but four fixed fat acids; viz. stearic, margaric, and two new acids, which the author calls *benic* and *moringic* acids.

The benic acid occurs in very small quantity in the oil of ben; it consists of $C^{30}H^{30}O^4$, and consequently belongs to the homologous series RO^4, being situated between myristic and ethalic acids. It crystallizes from its alcoholic solution in very voluminous tufts, and fuses at 126°—127°. Benic æther is very soluble in alcohol, and is deposited from the solution as a crystalline mass, but not in distinct crystals; it melts at a very low temperature, even by the heat of the hand, and contains $C^{34}H^{34} O^4$; it is isomeric therefore with margaric acid.

The other new acid, obtained by the saponification of the oil of ben, has been called moringic acid, from the name of the plant (*Moringa aptera*) which yields the oil. It is liquid, colourless or somewhat yellowish, and contains $C^{30}H^{28}O^4$, that is to say, 2 equivs. of hydrogen less than benic acid. From its composition it appears to be homologous to oleic acid. It would be interesting to ascertain whether, like the last, it would be decomposed under the influence of fusing potash into two acids of another homologous series. Its density is 0.908, its taste insipid and irritating, its smell faint; it reddens litmus paper, and is very soluble in ordinary spirit even in the cold. It solidifies at 32° F. It is decomposed by sulphuric acid on the application of heat.

M. Walter has verified the composition of this new acid by an analysis of the æthers it yields with alcohol and wood spirit.—*Ib.*, *from Comptes Rendus.*

Experiments on the Absorption of Arsenic by Plants. By Dr. HERBERGER.—The experiments were made in the summer of 1843 in a loamy and in a sandy soil containing very little humus, with seeds of *Triticum spelta* which had been steeped in white arsenic. Although all the parts were examined both before the formation of stem, before flowering, and also just before ripening, not a trace of arsenic could be detected. In each experiment at least 250 grms. of the substance were carbonized with sulphuric acid, and then immediately tested according to Marsh's process, as well as by the method of Reinsch.—*Ibid*, *from Jahrb. für Prakt. Pharm.*

On the Purification of Mercury. By M. ULEX.—In the distillation of mercury we are not only exposed to a very great loss, but the mercury is also not perfectly purified by it. This object is obtained, it is true, by digesting it with acids and perchloride of mercury; but it requires considerable time, as these agents are merely in contact with the surface of the mercury, and can only act upon all its particles by frequently repeated agitation. A solution of perchloride of iron alone possesses the property of dividing mercury to a very great extent. When, for instance, 1 lb. of mercury is treated with 3 drms. *Liquor ferri muriatici*, and the same quantity of water, and well shaken for half a minute, the entire mass is converted, with evolution of heat, into a dark gray mass. The perchloride of iron is reduced to the state of protochloride, while a portion of the mercury is converted into calomel, which latter prevents the globules of mercury running together. If the mercury contain any foreign metals in solution, they are more easily attacked by the chlorine than the mercury, and are either dissolved or precipitated in a pulverulent form. To see whether mercury is contaminated with foreign metals, for instance with tin or lead, merely shaking with air suffices. Chemically pure mercury does not deposit any black powder in this operation, nor does it coat the sides of the glass vessel with a pellicle of mercury. The latter occurs even with $\frac{1}{40000}$th lead; with $\frac{1}{3000}$th, the mercury deposits, even after shaking it for three minutes, a black powder; with $\frac{1}{1000}$th lead such a mass of the black powder is obtained, that the surface of the mercury is no longer perceptible. With 4 per cent., and even with 2 per cent. of lead, a solid crystalline compound is obtained. In general the amount of lead does not exceed 1 per cent. In order to effect the purification of the mercury by protochloride of iron, 2 lbs. of mercury are triturated together with 2 oz. of *Liq. ferr. mur.* of 1.48 spec. grav., and as much water for ten minutes; then the solution of iron removed by decantation and washing with water, and the mercury deprived of its humidity by gentle heat. On trituration, the greater portion of the mercury runs together; by suitable treatment with muriatic acid, the calomel may be separated from the mercury in the gray powder, and decomposed with protochloride of tin and muriatic acid. If the amount of lead exceed 1 per cent., the operation should be repeated.—*Ibid, from Archiv. der Pharm.*

Preparation of Uric Acid from Guano. By Dr. Bensch.—The guano is well boiled for several hours with common potash, slaked lime and a sufficient quantity of water; the solution separated from the residue by a conical bag, evaporated until it forms a thick paste, and thrown whilst hot upon a linen cloth and pressed. The pressed mass is diffused through water, decomposed with common muriatic acid, and the coloured impure uric acid washed with water. The washed uric is dissolved in dilute solution of potash, and evaporated until the boiling fluid assumes the consistency of a thick paste, thrown upon a linen bag, and strongly pressed. The pressed urate of potash is boiled with 2 vols of water, constantly shaken, then rapidly pressed, and this proceeding repeated three or four times; this causes the mass to swell considerably; hence constant agitation is requisite top revent its being burnt. If a portion, when dissolved in potash and precipitated by muriatic acid, does not yield a perfectly colourless uric acid, the urate of potash is again completely dissolved in solution of potash, and treated as above.

Lastly, the perfectly white uric acid is dissolved in hot water, to which a little solution of potash is added; the clear hot solution, when poured into muriatic acid, yields colourless uric acid.

The mother-liquors are evaporated and treated as above, the purer solutions of potash being used to dissolve the potash salt in the more impure.

By this method I obtained 2½ lbs. of pure uric acid from 100 lbs. of guano.—*Ibid, from der Pharm. und Chem.*

Errata.—In our last number at page 105 in the formula for indelible ink, the quantity of "strong liquor of ammonia" is stated as "f.ʒij.," when it should read f.℥ij.; our subscribers will please make the correction. At page 157 for "Francis Truman," read Francis Zerman.

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AMERICAN JOURNAL OF PHARMACY.

JUNE, 1847.

ART. XXV.—DRIMYS CHILENSIS. *De Candolle.* The Winter's Bark of Chili.

By Joseph Carson, M. D.

The genus *Drimys* belongs to the natural family of MAGNOLIACEAE, sub-order *Winteraceæ;* and to POLYANDRIA, POLYGYNIA of the Sexual System. The name *Drimys* was given to the genus by Foster, and has been adopted by De Candolle after Lamarck.

GENERIC CHARACTER. Carpels congested, baccate, many-seeded; filaments thickest at the apex; cells of the anthers separate.—*De Candolle.*

The *essential characters* consist in a *calyx* splitting unequally, the numerous *petals*, club-shaped *stamens*, with terminal two-lobed anthers, no style, berries superior and aggregate, and seeds several in a double row.

SPECIFIC CHARACTERS. *Leaves* oblong, obovate, glaucous beneath; *peduncles* crowded, one-flowered or arising from a common peduncle; *petals* six to nine, oblong subobtuse. *Berries* oval, sub-compressed, obtuse. *De Candolle*, Prodrom, vol 1, p. 78.

Dr. Lindley, in his Medical Flora, has confounded this plant with two other species—the D. *winteri* and D. *granatensis;* the former found in the neighborhood of the straits of Magellan, and the latter in the northern parts of South America.

This *shrub* appears to be common in the marshes of Chili, whence Mr. Dombey procured specimens. It was separated and made into a new species by De Candolle from the specimens examined by him in the Museum of Paris.

Similar specimens were sent to this country by Dr. Styles of Valparaiso, in 1836, some of which were deposited by me in the Herbarium of the Acadamy of Natural Sciences of Philadelphia. The leaves correspond to the description given by De Candolle; they are three or four inches long, and one wide. The flowers are axillary or terminal, from three to five together, in umbellated panicles which are an inch and a half or two inches long. The calyx in three distinct ovate sepals; the corolla somewhat stellate in form and constituted of at least twelve oblong ovate unequally sized petals. The germs are five in number, around which the shorter stamina are inserted on the receptacle.

The difference between this and the D. *winteri* consists in the character of the leaves, the calyx, and the number and form of the petals. The flowers, instead of being simple, are clustered.

The bark of this plant has the same aromatic and tonic virtues as the Winter's Bark, and is used for similar purposes.

Merat and De Lens state that the specimen of D. *winteri* which is in their possession came from Chili, and was sent by Dr. Bertero. Was it not the present plant? As no description was given, this question, can only be answered conjecturally. D. *magnoliæfolia*, the bark of which is called Canelo in Chili, is the same species.

The plate represents the Drimys Chilensis in flower. The fruit and inflorescence are those of the D. *granatensis*.

ART. XXVI.—ON FLUID EXTRACT OF VALERIAN.

By Evan T. Ellis.

(*An Inaugural Essay.*)

There is sufficient reason to believe, that valerian as a remedial agent has been much undervalued, at least in this country, and that it has consequently fallen into unmerited neglect. The causes which have contributed to produce this, may be traced in part to that ever fluctuating popularity from which some of our best remedies are not exempt; to the peculiar influence which soil and climate have upon this plant; and especially to the want of a preparation of it of uniform strength, possessing in a concentrated form the entire virtues of the root, and not liable to undergo any change. Little doubt exists that it possesses inherent properties, which might prove of decided advantage in neuralgic affections, when other remedies are either inadmissible or have failed to give relief.

The discovery of an organic acid in this root, has, like the alkaloids of Cinchona, directed attention to the subject, and opened a new field of research, as shown by several valuable communications already before us.

Valerianic acid presents to us an interesting aspect, existing as it does in combination with an essential oil, and separated by the oxidation of the latter. Recent experiments have shown us, that this oxidation can be accelerated by means of other substances, and results in the formation of a much larger proportion of acid, than if simply produced by the action of air alone; hence it is more readily and economically obtained, and thereby its use will be greatly extended. We have seen this acid advantageously combined with oxide of zinc, of iron, and with quinia, exhibiting in the class of salts called valerianates, the excellent properties of two valuable therapeutical agents—the one an acid, the other a base. It seems highly probable that it is to this acid, that the peculiar medical properties of valerian are chiefly due.

A preparation holding in solution valerianic acid must therefore possess the activity of the root, especially if the combination present the other valuable properties of the plant, divested of all that is inert and useless. A convenient form for administering a remedy, smallness of dose, and a facility of preparation by every skilful pharmaceutist, are not unimportant recommendations for a preparation of this kind; and such we believe will be found combined in the fluid extract of valerian.

Care is necessary on the introduction of a new preparation, that it may not be inferior to those already in use; for although novelty may induce a trial, its future employment must depend upon its efficacy.

Of the preparations of valerian now in use, we find all more or less objectionable. The tincture, on account of the small amount of root to the proportion of spirit. The volatile tincture of the Edinburgh College owes its properties almost wholly to the aromatic ammonia. The infusions in hot water are objectionable from their perishable nature, and containing, as they must, matters of no medicinal power. The solid extract must, from the nature of the article, be an inert preparation. The syrup prepared from the cold infusion has been advantageously used, but its value as a remedy, chiefly depends upon the care exercised in its preparation; it is mild and often inadmissible. The distilled water noticed, is without doubt the best of existing preparations, excepting the one we are about to notice, but is liable to variation of strength by age.

The class of remedies of comparatively recent date, termed fluid extracts, possessing, as they most undoubtedly do, in many cases, numerous advantages over other preparations of the same article, have obtained a degree of popularity commensurate with their superior excellence, and their introduction may justly be regarded as a new "era in pharmacy."

They mostly contain, as it is well known, a variable amount of sugar; but the term may, I conceive, be with more propriety applied to those, where, as in the case of the solid extracts, this ingredient is wanting.

Of the fluid extracts now in use, the most common, as those of sarsaparilla and senna, will not materially suffer by the action of heat in concentration, but in the present instance we have a volatile principle to extract, therefore the mode of procedure must be adapted to the peculiar subject under consideration. The first point is, what is worthy of extraction in the root. Secondly, the adoption of a standard of strength so important to prescriber and apothecary. From the best analysis of this root, viz: that by Trommsdorf, we have the volatile oil containing the acid, resin, bitter extractive, and other matters of no importance in a medicinal preparation. The oil and acid are very readily and effectually taken up by ether—resin by alcohol—and bitter extractive by water—hence the three menstrua are employed.

The form of apparatus best adapted, is the common displacement funnel, having the top secured by bladder, and a receiver fitted so as to prevent as much as possible the escape of the ether whilst acting on the root.

The standard of strength I have adopted, is eight troy ounces of the root to the fluid pint of the extract; it was my original intention to have given a recipe, in which the strength of an ounce of the root would be represented by a fluid ounce of the extract; but owing to the destructive influence of heat on evaporation, without which the fluid seemed incapable of retaining so large an amount of substance in solution, I was induced to abandon it, and think the above strong enough for all cases. The medium dose is a teaspoonful, containing, in solution, the active principle of thirty grains of the root.

In making this, as all other preparations of valerian, the selection of a prime article of root is a point of great importance, and of all that reaches our market the fresh English is decidedly to be preferred. The whole operation should be conducted with all those precautions so necessary in the proper management of displacement.

The proportions I have adopted are as follows:

Rad. Valerian. offic.	℥viij.	Troy.
Spt. Vin. Rect.	f.℥viij.	
Ether. Sulph.	f.℥iv.	
Aquæ	q.s.	

Having finely bruised the root, place it in the instrument. As the alcohol and ether do not interfere in their action, mix and obtain by careful percolation as strong a tincture as can be made, which may be determined by the liquid ceasing to acquire additional colour or taste; remove the last portions by water, and set the solution aside in an open dish in a warm room to evaporate, which it is allowed to do until all the ether and half of the alcohol are gone. The remainder then amounts to f.℥iv., is of a greenish colour, oily, containing all the acid, consequently having, in a high degree, the well known taste and odour of the root.

We then proceed with water, and if the first portion is mixed with any of the preceding menstruum, it should be submitted to gentle heat in order to expel it. The first f.℥viij. of cold infusion free from spirit are set aside, because if any of the volatile principles which may be left in the root are soluble in cold water, they will be taken up, and the concentration may be practised on the remainder without danger to the extractive. The root is finally exhausted with cold water, which is to be determined mainly by the taste; the colouring principle, continuing, as in the case of Krameria, after all the bitterness is extracted. Evaporate this by a water bath or steam-heat to f.℥iv., and finally mix all these solutions, and if a slight turbidness be observable, which has always been with me very trifling, it may be readily clarified by passing a few times through some of the exhausted dregs left in the displacement filter.

The product then is sixteen fluid ounces from the eight ounces of root, is of a dark brownish colour, limpid, having in a high degree the characteristics of the plant, of which it may be considered as an exact representative in an eligible form; the proportion of spirit is of course one-fourth. It has a specific gravity of about 1.215, is acid to litmus, and causes copious precipitates with nitrate of silver and subacetate of lead.

Having a simple extract, we may combine with aromatic or narcotic tinctures, so as to suit particular cases or views of the medical practitioner in its therapeutic employment.

With regard to its medical properties, I shall not of course be expected to say much. It may with safety and confidence be exhibited in all those cases which would indicate an anti-spasmodic or nervous sedative ; cases of wakefulness; nervous irritability—individuals accustomed to the use of opium and its preparations; also in neuralgic diseases attended with dyspepsia. I have received flattering accounts of its success in some of the above cases, a notice of which is out of place here.

The dose as before stated, is about a teaspoonful; it would probably be best to commence with a small dose, and increase until its effects on the system are fully developed. It may be readily swallowed in a little sweetened water.

Before closing this article, it is proper to remark, that an article prepared by Smith & Perry, of Boston, who we believe were the first to introduce it, is before the medical public. It is entirely different from the article prepared by the formula submitted above. The composition we are entirely ignorant of, but judging from the sensible properties should infer it was a compound extract.

ART. XXVII.—ON UVA, URSI OR BEARBERRY.

By J. Curtis C. Hughes.

(An Inaugaral Essay.)

The Uva Ursi is a low evergreen shrub, with long trailing stems. The leaves are short, oval, oblong, cuneate, smooth, shining, of a dark green colour on the upper surface. On the under surface they are of a lighter colour, and traced with veins of net work. When fresh, they are void of smell, but when dry and bruised they have the odour of hay. The flowers are of a reddish white colour. The fruit is a round berry. It is green at first, but when ripe it becomes red. The leaves are used for tanning, and would form a good substitute for sumac. This shrub inhabits northern Europe, Asia and America. It flourishes in a cold and barren soil. Our market is supplied from New Jersey.

Medical Properties.

Uva Ursi is an astringent tonic and diuretic. As an astringent it is applicable to all the purposes for which the vegetable astringents are used. The principal use of this medicine is in chronic affections of the bladder and kidneys. It has been used with success in strangury, with discharge of mucus; and also in gravel, by a direct action on the kidneys, and by giving tone to the digestive organs, in diabetes, gleet, fluor albus, menorrhagia, and pulmonary consumption. The dose of the powder ℈i. to ʒj. Of the decoction f.℥i. to f.℥iij. made by boiling 1 oz. of Uva Ursi with a pint and a half of distilled water to a pint. Of the extract grs. v. to grs. xv.

Chemical History.

1st. Two oz. of Uva Ursi in powder were treated by displacement with six fluid ounces of alcohol. The resulting tincture was of a dark green colour, and when evaporated to the consistence of a syrup, globules of a fixed oil floated on its surface, and on the sides of the dish a brownish matter was deposited, consisting of tannin, extractive and resin. After removing the fixed oil, the extract was treated with water, which dissolved the tannin, and extractive, leaving an undissolved portion, consisting mainly of resin and chlorophylle; soluble in alcohol and ether, and insoluble in acids. The watery solution of the extract was largely precipitated by tincture of muriate of iron.

2d. Uva Ursi when treated with ether by displacement, affords a deep green tincture, which leaves a greenish extract by evaporation, composed of tannin, chlorophylle, resin, and fixed oil. The extract, treated with water, is deprived of tannin, and the filter absorbs the oil, leaving the resin coloured with chlorophylle on the filter.

3d. Two ounces of Uva Ursi were macerated with acidulated water for twelve hours. The liquor was then strained and the residue boiled for twenty minutes three successive times in a pint of water. It was then displaced with water until it passed off nearly colourless and tasteless, and afterwards with alcohol until it ceased to remove any portion. It was then dried and weighed one oz., showing about fifty per cent. of lignin. This was without taste or odour, very brittle, readily decomposed with sulphuric acid, forming a thick black mass.

4th. Six oz. of Uva Ursi having been bruised and macerated in water for six hours, were then transferred to a retort placed in a sand bath; a solution of common salt was added, and a receiver adapted. The distillation continued for five hours. There was about a pint condensed in the receiver during the operation. The liquid in the retort was of a dark brown colour, but that which passed over was colourless; a light coloured oil collected in globules on the surface of the distilled liquid, having a very pleasant odour.

5th. An infusion was made of two oz. Uva Ursi with a pint of water. The infusion was precipitated with a solution of gelatin, forming tannate of gelatin, and the infusion was filtered. To a portion of the filtered liquid a solution of subacetate of lead was added; it produced a dull white precipitate. With lime water, a yellow, showing the existence of gum. To a second portion of the liquor a few drops of protochloride of tin were added, producing a white precipitate; with nitrate of silver a brown one denoting the presence of bitter extractive. To a third portion a few drops of tincture of muriate of iron were added; it turned black, proving the existence of gallic acid. Starch could not be detected with tincture of iodine.

Ashes of Uva Ursi were tested and found to contain potash and lime.

6th. One pound of Uva Ursi was macerated in water for twelve hours and displaced until two quarts of liquor were obtained. The tannin was precipitated with a solution of gelatin, and filtered. The liquor was evaporated to dryness, the extract remaining dissolved in strong alcohol, and treated with purified animal charcoal for twenty-four hours. It was then filtered, evaporated, redissolved in absolute alcohol, and treated with purified animal charcoal for twenty-four hours; filtered and crystallized by spontaneous evaporation. The crystals were pressed, redissolved in absolute alcohol, treated with animal charcoal, filtered and crystalized by spontaneous evaporation. This substance crystallizes in transparent, colourless needle-shaped prisms, soluble in alcohol, ether and dilute acid. It will not dissolve in essential and fixed oils. Its aqueous solution is precipitated by subacetate of lead and carb. potash; lime water, and tincture muriate of iron do not affect it. It is neutral to test paper, and combustible. One grain acted as a powerful diuretic.

From the experiments here detailed, it may be inferred that Uva Ursi contains tannin, gallic acid, gum, resin, bitter extractive, volatile and fixed oils, lignin, and a peculiar principle, which, as it embodies the diuretic power of the leaves, may be called *Ursin*. This principle is worthy of a further investigation, particularly as to its chemical relations and medicinal powers. If it should prove to possess, in full, the useful properties of the plant, it may become a valuable agent in the hands of the practitioner.

ART. XXVIII.—REMARKS ON THE OINTMENT OF PRECIPITATED CARBONATE OF ZINC, AS A SUBSTITUTE FOR THE CERATUM ZINCI CARBONATIS, U. S. P.

By Thos. S. Wiegand.

About a year since, having need to replenish my stock of prepared Carbonate of Zinc, an article was supplied, with which, on account of its colour, I was dissatisfied. Previous to this time, a paper (published in the American Journal of Pharmacy for 1844, page 182,) which stated that a coloured sulphate of baryta was extensively substituted for calamine, had attracted my attention: supposing the subject worth examining, I concluded to test the quality by chemical reagents; the result of this examination was that there was no zinc present.

Despairing of success in obtaining a pure calamine, I determined to prepare the carbonate artificially, which may be readily affected in the following manner:

Take of crystallized sulphate of zinc, 1 lb.
" carbonate of soda, "

The salts are to be dissolved in separate portions of water, and the solutions mixed; when the precipitate shall have subsided, the supernatant liquor is to be drawn off, and the precipitate washed till the washings no longer give a precipitate with a solution of chloride of barium ; when operating on three pounds of sulphate of zinc, this usually requires three days.

To secure an elegant preparation—it is necessary that the sulphate of zinc should be free from iron ; if not pure, it should be rendered so by boiling with a carbonate as recommended in the Amer. Jour. of Pharmacy, for 1846, page 242. When dry, it can be very easily reduced to a powder, which resembles in appearance calcined magnesia.

It was reasonable to suppose that a cerate made with a precipitated carbonate of zinc would be more efficacious than one made from a dense powder, as the minute division of the former would favour its activity, if its efficacy depend, as I suppose none will deny, upon the extent of surface exposed to the action of the fatty materials.

The cerate is prepared according to the formula of the United States Pharmacopœia, substituting the precipitated carbonate of zinc for the calamine. It has a white colour very slightly tinged with blue, and remains the same in appearance for several months.

It has been employed in all cases where the usual calamine cerate would have been used, and, in the opinion of the surgeon of the institution, with fully equal, if not greater advantage.

U. S. Naval Hospital, N. Y. Station, April 13*th,* 1847.

ART. XXIX.—PHARMACEUTICAL NOTICES.

By William Procter, Jr.

Donovan's Solution.

The formula for Donovans's solution, as published by its author, and of which a copy is found in the United States Dispensatory, presents so complex an appearance in the way of fractions of a grain, that many apothecaries, not possessed of a delicate balance and weights are deterred from making it.

Another objection is that a loss of iodine is occasioned by the exposure rendered necessary during the trituration of the three elements with the alcohol during the time that elapses before the combination is effected. The mercury rapidly acquires its dose of iodine, whilst the arsenic, which combines less readily, is liable to all the deficiency occasioned by vaporization. That this occurs is evident from a small quantity of arsenic left undissolved by the distilled water. The proportions in Donovan's formula are 6.08 grains of arsenic, 14.82 grains of mercury, and 49 grains of iodine, which are not exactly in atomic relation. In order that the preparation should be composed of one equivalent of each iodide, the numbers should be 5.5 arsenic, 14.82 mercury, 46.09 iodine, so that there is one-tenth of an equivalent of the arsenical iodide in excess. It is hardly probable that any sensible variation would be observable in the medicinal action of the solution if the iodides were used in equivalent proportion; and as their combining number is the same, the preparation of the solution may be much simplified.

The aggregate of the solid contents of half a pint of Donovan's solution is 70 grains, which is composed of 33⅓ grains of biniodide of mercury and 36⅔ grains of sesqui-iodide of arsenic. If the formula was made to require 35 grains of each iodide, and half a pint of water, it would be greatly simplified, and could be made extemporaneously. The addition of hydriodic acid to the solution is unnecessary in this case, and its design in the formula of Donovan is doubtless to supply any deficiency due to loss of iodine in the operation.

The following formula, closely resembling that of Donovan in the proportions, avoids the fractions of a grain :

Take of	Sesqui-iodide of arsenic,	36 grs :
"	Biniodide of mercury,	34 "
"	Distilled water,	half a pint.

Triturate the two iodides with half an ounce of the water until they combine and dissolve, and then add the rest of the water, and filter.

The sesqui-iodide of arsenic is easily prepared. One part of metallic arsenic is reduced to an impalpable powder, intimately mixed with five parts of iodine by trituration, then introduced into a small flask or thin vial, and the mixture very gently heated until liquefaction occurs. The vessel should be nearly full, so as to prevent the formation of much iodine vapour, and enable the operator to bring the fused iodide in contact with all parts of it, and include any iodine that may have sublimed on the sides. If, on cooling, the contents of the vial assume a reddish yellow colour and crystallize on the sides of the vial, and no iodine odour is apparent, the operation is finished. The vessel is then fractured and the iodide removed.

If the arsenic and iodine are pure and the process skilfully conducted, nearly the whole of the arsenic is combined, and the compound is quite pure enough for making Donovan's solution without sublimation.

The metallic arsenic should be bright and lustrous, and the iodine crystallized and free from water. The ordinary cobalt or fly stone, which is metallic arsenic, is often pure enough for pharmaceutical use.

Atropia.

The activity of good extract of belladonna, leaves little to desire on the part of the practitioner in the internal exhibition of this drug, the dose being quite small, yet in its external application, with a view to the dilatation of the pupil of the eye or as an application in neuralgia, the extract is so disagreeable an application that several European surgeons have sought to avoid the staining effect on the skin by resorting to the active principle, atropia, in an isolated condition. In the February number of the *Journal de Pharmacie et de Chimie,* it is stated that "among the new remedies employed by M. Berard in the treatment of diseases of the eye, *atropia* should be placed in the first rank. This alkaloid, which can now be obtained from some pharmaceutists, possesses incontestable advantages in certain cases over belladonna itself.

"The greatest of these advantages is certainly the extreme rapidity with which it effects the dilatation of the pupil even in very minute quantity, as for instance by a solution containing one grain in one hundred grains of distilled water.

"Another advantage appreciated by the patient is the fact that the use of atropia avoids all the smearing and staining of the face, so characteristic of the ordinary mode of applying the extract; and which creates so great a repugnance to its use."

According to the Dublin Quarterly Journal (November, 1846, page 553,) "Dr. Wilde of that city employs the solution of atropia of these strengths:

No. 1. Atropia grs. j. distilled water f.℥j. diluted alcohol gtts. iij.
No. 2. Atropia grs. ij. distilled water f.℥j. diluted alcohol gtts. iij.
No. 3. Atropia grs. iij. distilled water f.℥j. diluted alcohol gtts. iij.

The alkaloid is rendered soluble by a drop of nitric acid, and the spirit is added to make the solution keep.

A single drop of No. 1 placed on the conjunctiva of the lower lid causes dilatation of the pupil in a healthy eye in from five to fifteen minutes."

The best process yet published for atropia is that of Mein, noticed in the United States Dispensatory, and in which the root is the subject of treatment with alcohol, lime, etc. As we cannot get belladonna root here, the only available source is the best extract, which, independent of the large amount of inert matter to get rid of, is too expensive to be employed with that view. Those who incline to make the experiment, however, may proceed by treating the extract with warm water until all the soluble portion is dissolved, filtering out the chlorophylle and albumen, evaporating the solution to a syrup, dissolving this in alcohol, and filtering if necessary, and then proceeding as in Mein's process with lime, acid, etc.

Belladonna leaves contain a large quantity of dark colouring matter, which renders the recent juice claret coloured, and is the chief cause of the staining. A solution of extract of belladonna precipitated with subacetate of lead, the excess of lead carefully with sulphuric acid, and the solution filtered from the sulphate of lead, carefully evaporated to four times the weight of the extract, no doubt would answer all the purposes of the solution of atropia.

Syrup of Orange Peel.

Those who are in the habit of preparing the syrup of orange peel according to the United States Pharmacopœia, know that it is strongly disposed to fermentation, and rapidly loses its agreeable qualities in warm weather. When made by the following formula it is more aromatic and preserves readily.

Two ounces of recently dried peel of the sweet orange is reduced to powder and lixiviated with a mixture of two parts of alcohol and one of water, until six fluid ounces are obtained. This tincture is then poured over and mixed well with 32 ounces (av.) of sugar in coarse powder, and spread on paper until the alcohol has evaporated. When this is accomplished, the aromatized sugar is made into syrup with 16 fluid ounces of water, merely carrying the heat to ebullition in a covered vessel, straining and bottling hot. Prepared in this way, syrup of orange peel has a fine amber colour, and the orange taste in a marked degree.

ART. XXX.—ADHESIVE PLASTER EXEMPT FROM LEAD.

By M. Pettenkofer.

With the design of obviating the accidents that are occasioned under some circumstances by the absorption of soap of lead, and the' irritant properties of the oleo-resins; in a word, to prevent the inconveniences arising from the employment of adhesive diachylon in medical practice, M. Pettenkofer proposes the therapeutical employment of the following preparation: mix eight parts of soap of lime, four of resin of turpentine, and one of suet; boil the mixture with a sufficiency of water until the whole enters into a homogeneous fusion, and then malaxate it in water as usual. If any undissolved particles of lime soap remain, it should be strained through linen. Lime soap does not melt in boiling water when alone, but with the resin its fusion is easy and complete.

As to the lime soap, it can readily be made either by saponifying olive oil with hydrate of lime, or, better, by adding a solution of a soluble salt of lime to an aqueous solution of olive oil soap. In the first case, an ounce and a quarter of recently burnt lime is slaked with six ounces of water, and reduced to a homogeneous consistence, then heat six ounces of olive oil in a tinned copper basin to some degrees above the boiling point of water, and add the milk of lime to the hot oil and maintain the mixture at the temperature of boiling water, stirring constantly, until a small portion removed and cooled ceases to adhere to the fingers, and is friable. It is necessary to replace the water, as it evaporates during the boiling.

The soap of lime which furnishes the most beautiful plaster, is obtained by decomposing a solution of oil soap with one of chloride of calcium. The precipitate should be washed, expressed and dried; pulverized with half its weight of resin, (Térébenthine cuite,) and melt the mixture in boiling water with one-eighth of suet. This adhesive plaster resembles very closely in its consistence and exterior aspect that of lead employed at present, and it is very adhesive.—*Jour. de Pharm. from Repertorium für die Pharmacie.*

ART. XXXI.—ON THE EXTRACTION OF STRYCHNIA.

By M. J. F. Molyn.

The extraction of the vegetable alkaloids often presents considerable difficulty, because these active principles are found combined with acids, or mixed with other principles which accompany them in the different parts of the plant, and from which it is often very difficult to separate them. Nux vomica, which is used for the extraction of strychnia, in preference to St. Ignatius's beans, its commercial value being less, consists of a very hard horny substance, not easily penetrated by liquids; it contains a large quantity of gummy matter, which when the seeds are treated with water, dissolves together with the igasurate of strychnia. On adding lime to this solution, to decompose the salt of strychnia, the mucilage is precipitated with the alkaloid, forming a very abundant deposit, which requires a large quantity of alcohol to deprive it of the strychnia which it contains. If to avoid this gummy matter, the seeds be directly treated with alcohol, the process becomes very expensive, in consequence of the large quantity of alcohol that must be employed to dissolve the whole of the strychnia.

The objections which apply to the above means, have induced me to try the effect of fermentation, which does not at all affect the active principle present. The gummy and saccharine matters of the seeds are decomposed, carbonic acid is disengaged, while the lactic acid which is produced, decomposing the igasurate of strychnia and brucia, forms with these alkaloids very soluble lactates.

Availing myself of those improvements which have been suggested by authors who have directed their attention to the extraction of strychnia, and adding such modifications as my experience proved to be useful, I have fixed on the following process, which, in addition to its being economical affords a good result.

Mix nine pounds of nux vomica in coarse powder with water, so as to form a thin paste. Keep this at a temperature of from 68° to 78° Fahr. for several days, when fermentation will manifest itself by the disengagement of a large quantity of carbonic acid. The mixture is to be daily stirred, so that the whole of the powder may be exposed to the fermentative process. I think that when the washed seeds are previously boiled for two or three hours, so as more completely to dissolve the gummy matter, the process is abridged. The fermentation is completed in eighteeen or twenty days, and is indicated by the cessation of the disengagement of gas. The mixture is then passed through a hair sieve and pressed. The residue is boiled two or three times, according to the quantity of water employed. The liquids are left to become clear by deposition, and are then evaporated to about three gallons. Add nine ounces of quick-lime in powder, well stirring the precipitate; let it stand for six or eight hours, then separate the precipitate, and submit it to strong pressure. Heat the liquid to the boiling point, and add a slight excess of sulphuric acid; sulphate of lime is formed, which is allowed to subside, and the supernatant liquor is evaporated to about four pints; to this, one ounce of powdered quick lime is added, and the process above described, repeated. The precipitate resulting from this process, is pressed and added to the former; they are then dried and reduced to powder; this powder is digested in about ten pints of proof spirit, with a gentle heat. The spirit dissolves the brucia, the colouring matter, and a little of the strychnia, which may be recovered by evaporating the liquid, and allowing it to crystallize. The precipitate thus freed from brucia and colouring matter, and reduced to powder, is digested at twice, in ten pints of spirit of wine, sp. gr. 823. The solutions, which will be nearly colourless, are filtered, and four-fifths of the spirit recovered by distillation. On allowing the remaining solution to cool and stand for a day, the strychnia will be found at the bottom of the vessel, in the form of a white crystalline powder in a yellowish supernatant liquor. The liquor is to be decanted off, and the strychnia washed with proof spirit, which removes any remaining portion of brucia, and renders it chemically pure by one crystallization.—*Pharm. Journ. from Journal de Pharmacie d'Anvers.*

UNIV. OF CALIFORNIA

ART. XXXII.——ON THE SYRUP OF IODIDE OF IRON

By Messrs. T. and H. Smith, Edinburgh.

Most of the processes for syrup of iodide of iron which have hitherto come under our notice, appear to us unnecessarily tedious and complicated; although in the whole range of preparations included in the compass of the Pharmacopœias there is not, perhaps, a single one in which such a state of matters should be more carefully avoided. Consistently with correct adherence in the constitution of the resulting compound to the recognised formula, every effort should be made to render the operation simple, easy, and, above all, of speedy execution. The solution of iodide of iron before combination with the sugar in the form of syrup, is decomposed with such rapidity, that the eye can easily trace the changes of colour and appearance by which the decomposition is accompanied. The liquid from being quite transparent and almost colourless passes through deeper and deeper shades of green to brownish red, and in an amazingly short time is entirely decomposed and quite muddy from an abundant ferruginous precipitate. After a sufficient quantity of sugar has been dissolved in the solution to form a syrup, these changes are almost entirely arrested; so that even in an open vessel many days intervene before any striking alteration of colour can be remarked.

The process used by us for the syrup of iodide of iron is a modification of the formula of the Edinburgh Pharmacopœia, and, as we have by repeated trials long proved its value, it is here given for the use of the readers of the Pharmaceutical Journal.

Let a solution of iodide of iron be made in a flask with six hundred grains of iodine, two hundred grains of pure iron filings, and six ounces of *cold water*. The action being finished, after smart agitation for a few minutes, let the liquid, while yet hot from the intense chemical action, be boiled over a gas flame, or in any other more convenient way, till its brown colour has disappeared, which is easily known by the froth becoming white. Let the liquid be now at once filtered through a small filter into a bottle, which has previously been marked by pasting on the outside of the bottle a small slip of paper at the level of eighteen fluid ounces, and containing thirteen ounces and a half of refined sugar, broken down into pieces about the size of peas. When the solution has all passed through, which fortunately takes place with unusual rapidity, let the filter be washed with boiling water, a further quantity of which must also be poured into the bottle till the liquid reaches the level of the mark. Let the bottle then be introduced into a hot-water bath and briskly shaken at short intervals, till the sugar is quite dissolved; and having adjusted the level of the syrup to the mark by the addition of water, after again shaking the bottle, let the syrup, without a moment's delay, be bottled into small phials, and secured as much as possible from contact with the air and light, by careful corking, and covering the bottles with some dark-coloured paper. These are the proportions adopted in the Edinburgh Pharmacopœia, and the syrup contains one grain of the iodide in twelve minims, or five grains in one drachm ; but as the syrup first proposed by Dr. A. T. Thomson is weaker by two-fifths, containing three grains to the drachm, and which we believe is the strength of the syrup used in England, it is evident that the proportions must be varied accordingly. They will therefore stand thus :—

252 grains iodine
100 grains iron filings
2½ oz. cold water
10 oz. pure sugar.

Let the syrup, when finished, measure twelve ounces and a half, the level occupied by this quantity having been marked off on the bottle before-hand. It is advisable that the bottle used in the preparation of the syrup should not have a capacity more than about a third above the quantity to be made.—*Pharm. Journ.*

ART. XXXIII.—ON MARKING INK, FOR MARKING LINEN, &c. WITHOUT THE USE OF A MORDANT.

By Mr. Redwood.

The practice of marking linen and other similar fabrics employed as wearing apparel, or for domestic use, with a preparation of silver, commonly called *Marking Ink*, has prevailed for many years, and has now become almost universal. The preparation first introduced for this purpose consisted of a solution of nitrate of silver, thickened with gum arabic and coloured with sap green; but in using this solution it is necessary previously to apply to the article to be marked, a *preparation* or *mordant*, consisting of a solution of carbonate of soda.

The following formula has been very generally adopted in the preparation of this kind of marking ink:

℞. Carbonate of Soda ℥ss.
Distilled Water ℥iv.
Mix, and sign "*The preparation or Mordant.*"

℞. Nitrate of Silver ʒj. ℈ij.
Gum Arabic ʒij.
Sap green ℈j.
Distilled water f.℥j.
Mix, and sign "*The Ink.*"

The ink made from the above, or a similar formula, which, I believe, almost every druggist through the country has been in the habit of preparing and selling, when used according to the usual instructions, produces a result which is subject to no objection that does not equally apply to any other marking ink having silver as its basis.

Within the last few years, however, the marking ink made as above, has been to a great extent superseded by the introduction of a new kind of ink, which does not require the use of a *mordant* or *preparation.* This ink appears to be generally preferred to the other;—it is in one bottle, which occupies but little space, and its use is considered to be attended with less trouble and inconvenience than that of the other.

My attention has recently been directed to this subject, as I was desirous of introducing a good formula for *marking ink to be used as a mordant* into the new edition, now publishing, of Gray's *Supplement to the Pharmacopœia.* Several formulæ have been published in the Journals, for the preparation of this ink, but none of these have given complete satisfaction.

The following appear to be the principal requisites in this kind of ink:

1st. That it shall flow freely from the pen, and form a well defined mark without running or blotting.

2d. That it shall not require a very strong or long continued heat to be applied, by holding the article that has been written on to the fire, or passing a hot iron over it, in order to develope the black mark required.

3d. That the mark produced by it, when developed by the application of heat, or by exposure to light, shall be perfectly black.

4th. That it shall not destroy the texture of even the finest cambric.

After several experiments, I have succeeded in making a marking ink, which I think will be found to realize all the above conditions; it is thus prepared:—

℞. Nitrate of Silver ℥j.
Carbonate of Soda, crystallized, ℥iss.
Tartaric Acid ʒij. ℈ij.
Strong Liquor Ammoniæ f.ʒij. or *q. s.*
Archil f.℥ss.
White Sugar ʒiv.
Powdered Gum Arabic ʒxij.
Distilled Water *q. s.*

Dissolve the nitrate of silver and carbonate of soda separately in distilled water: mix the solutions: collect and wash the precipitate on a filter; introduce the washed precipitate, still moist, into a Wedgewood's-ware mortar, and add to it the tartaric acid, rubbing them together until effervescence has ceased; add *liquor ammoniæ* in sufficient quantity to dissolve the tartrate of silver; then mix in the archil, white sugar, and powdered gum arabic, and add as much distilled water, if required, as will make f.℥vj. of the mixture.

It will be observed that the essential difference between this formula and those which have been already published, consists in the use of tartrate of silver, instead of nitrate of silver.—*Pharm. Journ.*

ART. XXXIV.—ARTIFICIAL ULTRAMARINE: ITS COMPOSITION AND CHEMICAL PROPERTIES.

Ultramarine, whether native or artificial, always consists of silica, alumina, sulphur, and a little oxide of iron; but no two specimens contain these substances in the same proportions. Native ultramarine is procured from the lapis lazuli,—the artificial kind, according to Robiquet's process, is made by heating to low redness a mixture of one part of porcelain clay, one and a half of sulphur, and one and a half parts of anhydrous carbonate of soda, in a covered crucible so long as vapours are given off. When opened, the crucible is usually filled with a spongy mass of a deep blue colour, containing more or less ultramarine, mixed with the excess of sulphur employed, and some unaltered clay and soda. The results are, however, by no means uniform. The price of the native ultramarine was formerly five guineas an ounce, the artificial is sold at a few shillings an ounce, and is equally durable.

The colour of both is destroyed by nitric acid, or by a long-continued full red heat. Hence the difficulty in preparing the artificial variety. The destruction of the colour by nitric acid renders it easy to detect the admixture of cobalt, or Prussian blue, with ultramarine. The presence of indigo would be found by the use of sulphuric acid, which destroys the ultramarine and dissolves the indigo unchanged in colour. Strange as it may appear, even the artificial ultramarine is now largely adulterated. A specimen, lately examined by M. Chevalier, was found to contain forty per cent. of blue carbonate of copper. This is decidedly injurious, because the blue colour of copper, under exposure to air and light, slowly becomes green.

The discovery of artificial ultramarine was accidentally made by Vauquelin, in 1814. It was found on pulling down a soda factory, where sulphate of soda had been fused with charcoal, that some parts of the walls had a rich blue colour. This intelligent chemist examined the substance, and ascertained that it was identical in composition with ultramarine. Prizes were offered in France for a chemical process for its preparation; and the result was that methods were discovered about the same time by M. Guimet, Paris, and M. Gmelin, of Tubingen. The process of Robiquet above given, is an improvement upon those first devised, and all that is now wanted is to discover the conditions for *constant* success. Here is a field for the "young chemistry" of England, if it can be induced to withdraw itself for a short time from the discovery of organic bases.

The essential constituent of ultramarine appears to be sulphuret of sodium; yet on what does the splendid colour depend?—the arrangement of matter! As in the case of the brilliant scarlet biniodide of mercury, which is formed of a white liquid metal and an iron grey crystalline solid, it is impossible to explain the cause of the colours by reference to the existence of any colouring principle. For a long time ultramarine was supposed, like the lapis lazuli, to owe its colour to the presence of iron. Clement and Desormes, however, prepared it without a trace of iron, and, what no one up to that time had suspected, they proved that it contained twenty-two per cent. of soda.

Ultramarine, whether native or artificial, is a most durable colour, and has great solidity; it undergoes no change from the lapse of time, probably from its being already in the state of sulphuret. It is equally blue by daylight and in the yellow light of a candle, while in artificial light cobalt is violet, and other blues appear more or less green, unless admixed with lake or crimson to counteract the effect of the yellow rays. Ultramarine does not appear to have been known to the ancients, although the Egyptians, unaided by chemical science, had discovered a most durable blue, now as bright on their mummy cases, as when first laid down three thousand years ago! Upon the composition of this and the other colours used by the ancients we shall probably make some remarks on a future occasion.—*Pharm. Journ. from Med. Gaz.*

ART. XXXV.—PREPARATION OF CARMINE.

The following processes for the preparation of *carmine*, are taken from the 8th volume of *Dumas' Traité de Chimie, appliquée aux Arts*, which is just published.

Carmine, prepared with white of egg.—The carmines known under this name are made in the following manner:

℞. Cochineal, ℔j. ℥iv.
Carbonate of soda, gr. cxv.
Soft or river water, Cong. iv.

Boil these together for twenty minutes in a vessel, the depth of which is double its diameter, and which is furnished with two handles and a lip to facilitate the pouring out of the liquid. This boiler should also be furnished with an outer rim, which serves to support it over the furnace, so that the bottom alone is exposed to the fire. It should be heated with a wood fire, as the combustion of coal is found to be injurious to the quality of the carmine.

After boiling for twenty minutes, the boiler is to be removed from the fire, and ʒvj. of alum, and ʒj. of cream of tartar added. The mixture is to be stirred for a few minutes; the pan is then to be inclined so that the liquor may be easily decanted, and then left to itself. By degrees the refuse of the cochineal is deposited—the solution, which was of a violet colour, assumes a rose tint, then a bright red. The liquor is at this time slightly turbid, and evidently contains the carmine in suspension, but in such a fine state of division that it cannot be separated by filtration.

After standing at rest for about a quarter of an hour, the liquor is decanted, and passed through a very fine silk sieve. It is received into another pan, left at rest for a few minutes, and then decanted again, when a slight brownish deposit is left.

The white of two eggs, well beaten up, is then added, and the liquor well stirred. Sometimes the carmine separates immediately in a flocculent form, and of a beautiful scarlet colour. Sometimes the separation does not immediately take place; in this case the pan must be placed on the fire, and left there until the flocculent carmine floats on the surface, which always occurs before the commencement of ebullition. The pan is then taken off the fire, and the floating carmine made to deposit by submerging it with a brush; it is then allowed to stand for ten minutes, and carefully decanted. The liquor becomes transparent, and the deposited carmine is afterwards separated, washed with three or four pints of water and collected on a strainer.

It is dried in a stove at a temperature from 82° to 86° Fahr. If dried in the open air it would become mouldy.

The carmine thus prepared, will be in the proportion of five or six drachms to the pound of cochineal used; but two or three drachms more, almost as good as the former, may be obtained, by boiling the decanted liquor, and treating it with white of egg as before.

This carmine is well suited for the use of confectioners, perfumers, artificial-flower-makers, and manufacturers of red ink; but it cannot be used by artists, as it is too granular, and does not work well under the brush.

Carmine, prepared with Isinglass.—The following is the process for preparing this kind of carmine :—

℞. Cochineal, in powder, ℔j.
Subcarbonate of potash, ʒiijss.
Alum, in powder, ʒviij.
Isinglass, ʒiijss.

Boil the cochineal and carbonate of potash, in a boiler containing five pails of water. After boiling for a few minutes, take the boiler off the fire and place it on a table, inclined to one side so as to facilitate decantation. Add the alum in powder, and stir the solution. The liquor changes colour and assumes a more brilliant tint. After a quarter of an hour, the cochineal will have deposited, and the liquor have become as clear as if it had been filtered. It contains the carmine in suspension. The liquor is then decanted into a similar pan, and placed on the fire, adding the isinglass dissolved in a considerable quantity of water and strained. At the moment of ebullition the carmine rises to the surface, and a coagulum forms as in clarification with white of egg. The pan is then removed from the fire, and the liquor stirred with a spatula. After a quarter of an hour the carmine will be deposited, when the liquor is to be decanted and the deposit drained on a strained filter, and dried in the manner already described.—*Ibid.*

ART. XXXVI.—ON ARTIFICIAL AVENTURINE.

By Messrs. Fremy and Clemandot.

Although the manufacture of coloured glasses has been but recently introduced into France, it has recently been brought to such great perfection, that the gems produced by our manufacturers will, in many cases, bear comparison with those of Bohemia.

There is nevertheless a production of this class which had not as yet been manufactured in France; we allude to the artificial aventurine, which has hitherto only been made in Venice, and the manufacture of which is kept a profound secret. Fine specimens of Venitian aventurine are very scarce, and are sold at as high a price as 200 francs the kilogramme.

We were anxious to discover the mode of making this gem, and of giving the benefit of the discovery to our glass-workers.

After numerous experiments which have been conducted at the glasshouse of Clichy, we have been fortunate enough to obtain results, which although not brought to the highest degree of perfection, are, notwithstanding, of a nature to induce a belief that in future aventurine will be manufactured in France.

As we wish to supply to our manufacturers, as soon as possible, the deficiency which has existed with reference to this product, we hasten to make known our process for the manufacture of aventurine, hoping that they may bring it to that perfection which practice alone can give it.

The chemical analyses, made principally by MM. Wöhler and Barreswil, have proved that Venetian aventurine is composed of a soft glass holding in suspension metallic and crystallized copper. It appeared, then, that aventurine should be obtained by crystallizing copper in melted glass, and having the mixture in such a state that the metallic crystals shall remain disseminated through the vitreous mass.

But knowing the tendency of copper to oxidation, and its fusibility, and appreciating all the circumstances opposed to its crystallization, and the equal diffusion of these crystals through the fused glass, it will be easy to understand the difficulties we had to surmount.

The choice of the composition which, by the action of heat, should afford metallic copper, was not less difficult. We found it necessary to reject those bodies which, in producing copper, would require a temperature either too high or too low; in the first case the metal would become agglomerated before the fusion of the glass; in the second, it would fuse, separate from the glass, and collect at the bottom of the crucible. Neither could we admit of those reactions, which, in producing metallic copper, would give rise to an abundant disengagement of gas, or the deposition of a coloured or insoluble deposit in the glass. A composition had to be found which, at the temperature of the fusion of glass, would produce metallic copper.

After trying without success the action of different metals on glass coloured by oxide of copper, we have been led to examine the reduction which oxides at the minimum of oxidation are capable of effecting on protoxide of copper, and our attention was principally directed to the action in this way of iron scales.

We have found that, under the influence of heat, iron scales quickly reduce the protoxide of copper to the metallic state, passing itself to the state of peroxide of iron. This reaction appeared well suited to fulfil the end we proposed; it produces pure copper, and has the advantage of forming a metallic oxide, soluble in the glass, and giving it only a slight yellow tint. The formation of a silicate of peroxide of iron is a fortunate circumstance, for, by increasing the density of the glass, this silicate would naturally oppose the deposition of the metallic crystals. We, therefore, with confidence tried to produce Venitian aventurine by heating a mixture of glass, protoxide of copper, and iron scales. The experiment confirmed our anticipations.

On heating for twelve hours a mixture of 300 parts of powdered glass, 40 parts of protoxide of copper, and 80 parts of iron scales, and then allowing it to cool very slowly, we obtained a vitreous mass, containing, in abundance, crystals of metallic copper.

The most difficult point in the manufacture of aventurine, namely, the production of a glass containing brilliant crystals of copper, uniformly diffused through the mass, has, therefore, been completely resolved.

The specimens of aventurine which we now present to the Academy, have a certain degree of opacity which destroys the brilliancy of the metallic crystals, and these crystals also are not so large as they should be; but the experiments we are now making lead us to hope that we shall soon have specimens completely satisfactory.

To convince ourselves of the identity of our aventurine with that made at Venice, we have examined them with an excellent microscope, and we find that in both the copper is crystallized in regular octahedrons.—*Pharm. Journ. from Journal de Pharmacie.*

ART. XXXVII.—ON THE CONSTITUTION OF BEBEERINE.

By Douglas Maclagan, M. D., F. R. S. E., and Thomas G. Tilley, Esq. Professor of Chemistry in the Queen's College, Birmingham.

Bebeerine is the name given by Dr. Rodie, of Demerara, to an organic base, of which he pointed out the existence in the bark of a tree of that colony, known by the name of *Bebeeru* or *Green Heart*. This tree has recently been examined botanically by Sir Robert Schomburgk, and found to be a species of *Nectandra*, which, in compliment to Dr. Rodie, he has named *N. Rodiei* (*Hooker's London Journal of Botany*, December, 1844.)

The general properties of the alkali, and the preparation of its sulphate for medicinal use were further described by one of us in a paper read before the Royal Society of Edinburgh, in April 1843, (*Transactions*, vol. xv. part iii.) In this memoir an account was given of the preparation of bebeerine, in what was regarded as a state of chemical purity, and of its separation by means of æther from what was believed to be another alkaline matter, sipeerine; but as the substance is neither crystallizable nor colourless, it could not decidedly be affirmed to be chemically pure until its constitution had been determined by ultimate analysis. This desideratum it is proposed to supply in the present paper.

The chief difficulty in preparing the pure alkali arose from the troublesome process required to free it from adhering tannin, considerable loss being experienced in the methods then adopted. This has subsequently been accomplished with greater facility by the following process, which may be applicable to the purification of other organic bases.

The sulphate prepared for medicinal use, which is always more or less impure, is precipitated by ammonia; and the alkaline matter thus separated, is, after washing with water, triturated with about an equal weight of freshly precipitated and moist hydrated oxide of lead. The magma thus formed is then dried over the water-bath, and the alkali is taken up by absolute alcohol. On distilling off the spirit, the organic base is left in the form of a transparent orange-yellow resinous mass, as described in the paper above quoted. This, on being dried, pulverized, and treated with successive portions of pure æther, is in great part dissolved in this fluid. The dissolved portion, on distilling off the ether, is obtained in the form of a translucent, amorphous, but homogeneous resinous-looking substance, of a pale yellow colour, and possessed of all the properties of an organic alkali. This is pure bebeerine, as described in April, 1843.

Bebeerine thus obtained does not crystallize. It is very soluble in alcohol, less so in ether, and very sparingly in water. Heated, it fuses; and the heat being continued, it swells up, giving off vapours of a strong peculiar odour, and burns without residue. Subjected to the action of oxidizing agents, it gives with bichromate of potash and sulphuric acid, a black, and with nitric acid a yellow resin. It forms with acids salts which are all uncrystallizable; with perchloride of gold, mercury, copper, iron and platinum, it gives precipitates which are soluble to a certain extent in hot water and alcohol, but which on the solution cooling, are not deposited from it in a crystalline form.

When precipitated by ammonia from its solution in acids, it is obtained in the form of a very pale yellow powder. This was examined with a view to determine whether or not it was a hydrate of the alkali. It was washed, dried *in vacuo* over sulphuric acid, and heated in an oil-bath. At 108° Fahr. it began to soften, and at 370° it fused into a transparent brown resinous mass. It did not sensibly lose weight during the process, and had undergone no change in properties from exposure to this temperature, as it retained its perfect solubility in acids, and formed with them the usual bright yellow solution.

The results of several ultimate analyses of two different specimens of bebeerine give the following as its composition, $C^{35} H^{40} N^{2} O^{6}$.

It appears to have been sufficiently established by the experience of medical practitioners, that bebeerine possesses marked properties as a remedy for periodic diseases, (Maclagan, *Edinburgh Medical and Surgical Journal*, April, 1845.)

On comparing its composition with that of other vegetable alkalies possessed of similar remedial powers, such as quinine and cinchonine, it is not a little remarkable that it differs from them in atomic constitution, and that it is isomeric with morphia, which acts as a pure narcotic. The atomic constitution of morphia, calculated from the formulæ deduced by Liebig and Regnault from their analyses, agrees perfectly with that given above for bebeerine. The composition of the two bases is, in fact, identical.

This is the first instance of isomerism occurring in substances belonging to the class of organic bases.

One very interesting conclusion regarding the action of medicinal substances appears to be deducible from these results, that similarity of physiological properties does not depend upon similarity in the proportions of their constituents. It seems probable that the mode in which their atoms are grouped has an important share in modifying their physiological actions; for in the present instance we have the same number of atoms both in morphia and bebeerine, but in the one producing a white crystalline body of narcotic qualities, in the other a yellow amorphous resinous-looking substance, acting as an anti-periodic. The difference in their physical properties in fact proves that their elements are differently arranged.

We have not been enabled to examine *sipeerine*, the substance left behind when pure bebeerine is dissolved out by means of æther. It occurs in a very minute quantity, and requires a very tedious repetition of the treatment with ether to free it from the last traces of bebeerine. There seems, from some trials which we have made, good ground for believing that it is a distinct alkali, but it has not been obtained in sufficient quantity to enable it to be subjected to ultimate analysis.*—*Pharm. Journ. from Proceedings of the Chemical Society.*

ART XXXVIII.—NOTE ON THE FRUIT OF THE MYROXYLON TOLUIFERUM.

By M. Leroy.

It is about a year since M. Méneir made known a species of fruit imported recently into France, and which was stated to be derived from a tree called by De Candolle, *myroxylon* or *myrospermum* toluiferum, and which belongs to the family Leguminosæ.

It is a pod, three or four centimetres long, two to three wide, inflated near the middle, furnished with a membranous wing at one of its sides, which gives it the aspect of the profile view of a caputchin, and presenting occasionally near the centre a depression, owing to the fact that the fruit sometimes contains two kernels, and sometimes but one.

The colour is dirty yellow, with black spots of various sizes, and which increase so much in some specimens as almost to hide the yellow colour. The surface is wrinkled longitudinally and a section of the peduncle presents numerous nerves which correspond with the wrinkles on the fruit.

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*See vol. 8th, page 199 of this Journal for an account of the Bebeeru tree, etc.—*Ed. Am. Jour. Pharm.*

Most generally this fruit contains but one kidney-shaped thick kernel, and terminated at each end by a hemispherical surface; but in those cases where there are two kernels, the ends that are in contact are modified by pressure in the act of growing in contact.

The texture of the fruit is fibrous, and on each side of the kernel a cell filled with a resinous substance is observable which does not contain a particle of benzoic acid.

The kernel developes a very decided odour analogous to that of the Tonka bean. When chewed, it presents a biting acid taste at first, which is not persistent.

Heated in a small retort with an alcohol lamp, it carbonizes, and a blackish liquor, having a very disagreeable empyreumatic odour, passes into the receiver.

Treated by strong alcohol, it gives a tincture but little coloured, which, by slow evaporation in a moderately heated stove, deposited needle shaped crystals impregnated with an oily matter emitting a strong odour of coumarin.

These crystals present altogether the peculiar characteristics of the crystalline matter of Tonka bean and Melilot; they are heavier than water, not soluble in that liquid, entirely soluble in alcohol, less so in pure sulphuric acid. The solution diluted with water is precipitated in light flocks. They have no action on tincture of litmus and syrup of violets. These different properties place this crystalline matter among the proximate vegetable principles, and are sufficient evidence of its identity with *coumarin;* and that the fruit of the *myroxylon toluiferum* is the third substance in which this principle has been observed.—*Journal de Pharmacie.*

ART. XXXIX.—ON THE DETECTION OF POISON IN THE URINE.

By H. Letheby.

The author briefly referred to the experiments of Wöhler and Steyberger, Tiedemann and Gmelin, Orfila and others, in showing that many mineral, animal, and vegetable poisons are admitted into the circulation, and eliminated by the action of the kidneys.

These facts led him to inquire whether the various poisons might not be disposed of in a similar manner; and if so, whether their existence in the renal secretion might not furnish a hint for the treatment of cases of poisoning; and, also, whether their detection in the urine would not supply evidence of a very valuable character for the guide of the medical jurist.

With these objects in view, he analysed the urine of persons under the influence of the various poisons, and tested his results by experiment upon the lower animals.

He succeeded in detecting the following poisons:—sulphuric, muriatic, nitric, phosphoric, and oxalic acids; of the alkalies, he had discovered the presence of potash, soda, and ammonia; of the neutral salts, he enumerated nitrate of potash, iodide of potassium, sulphate of magnesia, the red and yellow prussiates of potash, and chloride of barium; of the salts of the other metals, he had recognised those of antimony, arsenic, lead, mercury, copper, iron, and silver.

With the view of detecting the organic poisons, the author instituted another class of experiments, the object of which was to ascertain if the vegetable poisons would, after their administration, endow the urine with any special physiological power over the system of another animal; and the conclusion to which he came was, that the active principles of many organic poisons, such as opium, belladonna, hemlock, aconite, &c., would, in part, pass through the system, and appear in the urine unchanged.

With respect to the second question, as to whether their detection in the urine might not furnish a hint for the treatment of cases of poisoning, the author showed, from experiment upon animals, that diuretics were of great service in getting rid of poisons which had been administered to them, and thus helping them very considerably in their recovery.

The third question embraced by the paper, viz., whether the detection of the poisons in the urine might not supply evidence of a very valuable character for the guide of the medical jurist?—was proved to be an important one, inasmuch as the urine might be the only fluid or product at the disposal of the chemist; 2ndly, the evidence deduced from it might be of a positive, and, therefore, satisfactory kind; 3rdly, those poisons are recognised with more ease in this secretion than they are in the tissues; and 4thly, they may exist there to a larger amount than in any other part of the body.

A few other questions were referred to as having an important bearing on this subject, as—

1st. Whether every poison makes its way to the urine, and what are characters by which it is to be recognised?

2ndly. What is the smallest amount of each of the poisons capable, after its administration, of being detected in the urine?

3rdly. What is the earliest period at which the different poisons may be recognised, and what the latest?

4thly. Whether any relation existed between the quantity discovered in the urine, and the quantity administered?

5thly. Whether there are any circumstances which may increase the facilities for their elimination, and whether there are any which may diminish them?

These were questions which the author of the paper hoped to determine at some future period; at present, he believed that the facts, as they stood, warranted the following conclusions:—

1st. That many poisons are absorbed into the circulation.

2ndly. That those poisons are eliminated by the kidneys, and may be detected in the urine, either by their chemical or physiological reactions.

3rdly. That these facts, together with others from experiment, point to the value of diuretics in the treatment of cases of poisoning.

4thly. That it is possible to obtain, from an examination of the urine, some of the most valuable and certain evidences regarding the administration of a poison.

5thly. That we should not omit to examine this secretion in every case of suspected poisoning.

In the course of the paper, the author alluded to the presence of an excess of phosphates in the urine of persons occupied in the manufacture of lucifer matches, and referred it to the inhalation of phosphoric and phosphorous acids generated by the slow combustion of the phosphorus. He proposed a very simple remedy, that of exposing shallow vessels, containing turpentine, in different parts of the building, but especially in those situations where the phosphorus was most liable to oxidation: by this means he found that the vapour of turpentine would become diffused through the atmosphere, and so check that slow combustion of the phosphorus which was the source of all the mischief to the workmen.

Dr. Golding Bird remarked that the paper just read contained some points of great interest; the most interesting, however, being, probably, the least novel. Thus it was long ago demonstrated that the kidney carried from the circulation all effete and injurious matters that were held in the blood in solution, either in a changed or an unchanged condition. This latter law was of universal application, whether it related to saline or vegetable matters.

One of the facts mentioned in the paper confirmed the experiments made by Donne and himself, (Dr. Bird) that when oxalic acid was taken into the stomach, either as a medicine or as it exists, combined with potash, in sorrel, it was afterwards found in the urine, forming crystals of oxalate of lime. Dr. Letheby had found it in combination with urea. The experiments on the mineral acids were evidences of the remarkable depurating action of the kidneys, as mentioned by German writers; but before we could judge of the value of these experiments, the data upon which they were made must be examined. He had no doubt of the accuracy of these researches, for it must be remembered that sulphuric and muriatic acids existed in the urine; the former becoming greatly increased if the person ate mustard or other articles containing sulphur. He had been a little surprised to hear that the mineral acids in a free state were so soon detectable in the urine; for though it was mentioned in books as possible, he had repeatedly tried to detect it, and had been vexed to find how different were the results to those he had expected. He might, indeed, observe, that he had never succeeded in making urine acid by the exhibition of the acids, except by the benzoic. He had given the sulphuric and nitric acids in cases of alkaline urine for weeks together, but had never succeeded in making that fluid acid. One of the facts stated in the paper was of a startling character, viz., that from three to five grains of arsenious acid might be safely taken into the stomach if the kidneys were stimulated to diuresis, as it would be carried off by this channel. He could not understand how this could be, unless, indeed, there was some short road to the kidneys not at present known; for the arsenic, before it reached these organs, must be absorbed into the circulation. It was difficult to understand how escape from the poison was effected. The experiments respecting the absorption of the metallic poisons confirmed the experiments of the best French chemists. His experiments, also, respecting the presence of antimony in the urine, from poisoning by that agent, confirmed the views of others.

Dr. Snow said that the difficulty of removing an alkalescent state of the urine, by the administration of the mineral acids, was no proof that these acids did not pass off by the urine; for in nearly all cases of alkaline urine it became alkaline after its secretion, from the decomposition of the urea, and such an amount of ammonia was produced in this way as it would be almost impossible to neutralise by any quantity of mineral acid which could be safely administered as a medicine.

Dr. Letheby observed, that the remarks of Dr. Snow had rendered it unnecessary for him to answer Dr. Bird, as far as regarded the detection of the mineral acids in the urine. He might observe, however, that in these experiments, the urine had been in the normal state, when, in fact, it was slightly acid, not when the phosphates were thrown out, as as these would, of course, neutralise the acid given by the stomach. After giving these acids, the urine became more acid, the acids being formed either in combination with their base or not; but this did not affect the question. He could not explain, any more than could Dr. Bird, in what way diuretics acted in cases of poisoning, but he had merely mentioned the facts which he had observed.

Dr. Copland, in 1821, had published a memoir on chemical remedies, and their mode of elimination from the system; and, in 1824, had experimented with the mineral acids and camphor. These experiments would be found in a forthcoming number of his "Dictionary." One circumstance which he had noticed in relation to these acids was, that the sulphuric was more easily detected than either the nitric or muriatic acids; but this he had supposed, at the time, to arise from the circumstance of the two latter acids being decomposed. He had found the same difficulty as had the author, in detecting vegetable substances in the urine, as turpentine, camphor, and other volatile substances were sooner carried off by the mucous membrane of the respiratory organs, than by that of the urinary. The depurating power of the kidneys had not been overlooked by

British writers, who had done as much in this respect as the Germans; the latter, however, had great tact in taking hints from us, and, as the Methodists would say, "enlarging" upon them. One fact might be mentioned in reference to the action of diuretics in stimulating the kidneys in cases of poisoning, viz., that often the excitement in the circulation was so great that the secretion of urine was altogether arrested. We should, in consequence, fail in the exhibition of diuretics, unless we first got rid of the congested state of the kidneys by depletion and diluents.—*Chem. from Royal Med. and Chir. Soc.*

ART. XL.—ON A NEW METHOD OF ESTIMATING NITRIC ACID.

BY M. GOSSART.

THE examination of the oxidizing action of nitre under the influence of sulphuric acid has proved to me that, in a great number of cases, the products of this action may be rendered constant, and so furnish a large number of processes for the accurate estimation of nitric acid and the nitrates. In the following method I have been guided by the principle applied by M. Pelouze to the estimation of copper. In analysing crude nitre I employ as reagents,—1st, an acid solution of the protosulphate of iron;* 2nd, a very dilute solution of the red ferrocyanide of potassium.

I pour into a flask with a long neck 50 cubic centimetres of sulphuric acid of 1.704 spec. grav., and 25 of a solution of saltpetre containing 10 grms. of refined saltpetre in a demilitre; I then add, with a graduated burette, some drops of the solution of the protosulphate of iron, and agitate gently; the mixture becomes brown, suddenly clears again, and acquires a more or less deep straw colour. I then continue to add in drops a normal solution, the strength of which I wished to ascertain, waiting each time until the liquid brightens; when these changes of colour become less rapid, I apply a gentle heat; and when they are no longer perceptible, I examine whether, on taking a few drops with a pipette, they still yield a blue colour with the red ferrocyanide of potassium. When this blue colour appears, and no longer disappears on boiling the liquid, I note down the total number of the divisions employed. A second examination, in which a large number of the trials may be dispensed with, will yield an accurate result.

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* The solution of the protosulphate which I have usually employed was strongly acid and nearly saturated.

Let N be the number of divisions of the normal solution requisite to saturate completely 25 cubic centimetres of the solution of refined nitre; I weigh off 10 grms. of the saltpetre to be examined, which I likewise dissolve in a demilitre of water, and determine, in the same manner as was done for the solution of refined saltpetre, the number N^1 of divisions of the protosulphate of iron required to saturate completely 25 cubic centimetres of this solution; and the fraction $\frac{N^1}{N}$ gives the strength of the saltpetre under examition with great accuracy.

The process, which is applicable to the estimation of nitric acid, and of all the nitrates in general, may be employed for determining the quantity of nitric acid contained in gun-cotton. For this purpose, the whole of the cotton is oxidized with a mixture of sulphuric acid and peroxide of manganese; the liquid is filtered, and decolorized with a few drops of protosulphate of iron, which decomposes the whole of the sesquioxide of manganese before acting upon the nitric acid. In this manner a solution is obtained containing the whole of the nitric acid which existed in the pyroxyline, and the amount of which may be readily estimated.—*Chem. Gaz., from Comptes Rendus.*

ART. XLI.—ON THE CONDITION OF THE APOTHECARIES IN THE INTERIOR OF AFRICA, according to the Verbal Information communicated by an Empirical Physician from Kartum. By X. Landerer, of Athens.

The condition of the Apothecaries in the interior parts of Africa, is truly miserable. In these persons, ignorance, cunning, and avarice are conjoined with charlatanry. They are called *Speziarides*, and their shops *Speziaria.* They are generally Jews, Armenians, and Turks, who have for some time, in Constantinople, assisted in a Chemist's shop, or lived with a *Hekim* (Physician.) or practised as *Serahs* (Surgeons) in an hospital. No particular permission by the authorities is required for opening a *Speziaria;* the whole license consisting in the possession of 2000 or 3000 piasters. The shop consists of a more or less spacious wooden moveable booth, in which medicines are exposed to view on wooden shelves in glass vessels, boxes, and sacks. Immensely large white glass bottles with glass covers, on which usually are fixed oil-lamps, in which the oil swims on two or three kinds of differently coloured liquids, contain the best samples of indigenous and exotic products, such as senna, gums, tamarinds, cassia, sarsaparilla, corrosive sublimate, sulphate of copper, corallia, margaritæ, spongiæ, lapides spongiarum, &c., &c. In the middle of the shop stands a little table, on which is a small standing pair of scales, with some small hand-scales hanging up. There are also some *Argelledes*, or Turkey tobacco-pipes, with elastic tubes, for the Hekims or Serahs, who come there either to wait for their patients or pass their time in chatting and smoking. They generally come very early, and spend almost the whole day in the shop, sitting cross-legged. As weights, grains of sesamum, or of wheat, and date-stones, are used. The arrival of a patient often serves as a bone of contention and quarrel among the Serahs, each of whom tries to obtain the custom of the patient, who not unfrequently selects him who offers to undertake the cure for the smallest sum. The fee is a quarter of a ducat for a consultation and prescription at the Speziaria; but when the Hekim goes to the house of the patient, he receives, in the case of a wealthy man, from three to five or ten gold pieces, which a servant presses into his hand. The Speziaris, or Apothecary, who has an understanding with the Hekim, charges not much less for the medicine. If the disease requires longer attendance, a contract is made between the physician and patient at the first visit for attendance and medicine; and half of the sum agreed on is paid down immediately, while the other half remains until the cure is completed. In chronic diseases, some thousands of piasters are asked. An Arab assured the writer of this, that he had to pay 8000 (?) piasters for being cured of jaundice, besides the medicines, which, being prepared of gold, cost him 5000 (?) piasters more. If the patient dies, the Physician obtains nothing more, but must be content with what he received in advance. In cases where a patient has been cured of a very dangerous illness, the Hekim receives, besides his fee, additional presents, consisting of costly confectionaries, tobacco-pipes with amber mouth-pieces, aloe-wood, horses with beautifully and richly ornamented trappings, &c. &c. In particular cases, and in the night, a horse is sent with from five to ten servants to fetch the Physician, who frequently receives for such a visit thirty ducats.

All compounded medicines are imported by the Apothecary from Alexandria, Cairo, and Constantinople; but the more simple ones he prepares according to his own pleasure, or after a *kital*, *i. e.*, a manuscript which goes down from father to son. A great many objects of natural history are also to be seen in the Apothecary's shop; for example, ostrich-eggs, serpents, ichneumons, crocodiles, lobsters, river fish, elephants'-teeth, sea-shells, coral stones, sponges, pearl-shells, &c., from all of which substances costly medicines are prepared. Thus, from the eggs of the ostrich, perfumed balsams are prepared as antidotes against corrosive sublimate and arsenic; and also a *matsun* (electuarium) against dysentery and rheumatism. From embalmed serpents and toads, tinctures are prepared for strenghtning the nerves, and in these gold and silver leaves are floating, thus proving that the medicine is prepared from pure gold and silver. From the bones of the ibis a mass is prepared, which is formed in brass moulds, and sold as amulets against the bite of serpents. From the ichneumon is prepared with oils a very strong smelling ointment, which is used for wounds produced by the crocodile. In large glasses, bleached camel's-hair is preserved. This is employed to stop hæmorrhage from wounds, by strewing the finely cut hairs in the wound. Furthermore, the Speziarides prepare from pearls a tincture for contagious diseases, and as a proof that it is actually prepared from pearls, undissolved pearls are seen floating about in glasses filled with some red coloured liquor. The different bezoars form in these countries important articles. Bezoars of the serpent, the crocodile, the buffalo, and the camel, are to be seen of extraordinary size, set in gold, and ornamented with pearls, in the most beautiful glasses, or hanging about in the shop, The *matsuns* (electuaria) form, among the Africans, one of their principle forms of medicines; and accordingly we find that for each disease there is a particular matsun. Thus, they have matsuns of dates and of bananas against dysenteries, complaints of the chest, &c.

The minor surgical operations, such as bleeding, opening of abscesses, &c., are performed by the Speziarides, and that in the open street, in order to attract the attention of the passers by, who often collect around the Serah or Speziaris and his patient in great crowds, amongst whom there are not unfrequently hired spectators, who cry up the skill of the operator.

Chemical operations are also publicly performed; for example, the distillation of the *liquor Hoffmani*, or some aromatic spirits, &c.

It is very difficult, for foreign physicians (*i. e.* Europeans) to establish themselves in these parts; for they are persecuted by the natives in every possible manner. The latter exert all their power of persuasion to convince the higher classes that European Physicians are not acquainted with the climate, and that they effect the cure by the assistance of Satan, or that they employ poisonous substances, which do indeed possess the power of temporarily checking and apparently curing the disease, but that this, in a short time, breaks out again with augmented virulence. When an European Physician is patronized by one of the European Consuls, and is recommended by him to some of the higher families, whose confidence he contrives to gain, he may succeed in amassing, in a few years, a large fortune; but otherwise he is often scarcely able to gain his daily bread. *—Pharm Journ. from Buchner's Repertorium.*

ART. XLII.—ON CHINESE PHARMACY.

The drug shops of China are large, and are commodiously fitted up. They have a great array of drawers and jars arranged much in the same way as in England; glass vessels are very rare. Different departments are allotted to separate classes of medicaments; care is taken to keep things in order; and there is a degree of neatness and method in their appearance which would not be discreditable to a London laboratory. They do not seek notice by party-coloured bottles and cabalistic signs, which make so great a figure in the windows of some English medicine venders, but are rigorously plain, and, as far as mere appearance is concerned, appropriate.

On examining the contents of the drawers, boxes, &c., few things were observed identical with, or similar to, the medicinal substances employed in Europe. Camphor, rhubarb, and liquorice, were conspicuous among recognised articles; but our familiar friends in the shape of purging salts, calomel, tinctures, &c., were nowhere found. Even opium, of which so much is used as a luxury, does not appear to be admitted in the materia medica; at least it could not be traced in any form in the drug-shops. Cinnabar, or a substance much resembling it, is a favorite remedy in many external diseases, and it consequently is a prominent article in every collection.

On the Druggists' counters are ample boxes containing preparations for such purposes as these—to arrest cholera instantly, to communicate strength directly, to infuse courage, to excite love, and to confer the faculty of being loved, and so on, in proportion to the wants and wishes of individuals. This is sufficiently ridiculous, but is not more so in reality than the pretensions to similar efficacy constantly put forth in more enlightened places, and is probably much less mischievous. The Chinese panaceas, hero-making mixtures, philtres, and medicated charms, are believed to be generally harmless, which is more than can be predicated of many of the compounds so much vaunted and consumed in England under the name of antibilious, antidyspeptic, antinervous, *antiomnia mala* medicines.

For a small fee, not equal in value to a shilling, the Chinese physician, after examining the pulse, exhibiting great interest in the welfare of the patient, and profound knowledge of his case, writes a recipe, which, in imposing appearance, would put to shame the most elaborate performance of a London Professor. It occupies generally a large sheet of paper, is often diversified by red, added to the ordinary black characters, and is altogether a learned and laborious-looking composition. When carried to the Druggist, he spreads it on the counter, examines it attentively, and then proceeds to dispense *secundum artem.* Many ingredients, seldom less than nine or ten, make up the total of articles prescribed; they are almost always powders, sliced roots, or other dry substances, fluids being seldom sent from the apothecary's store. For each a separate piece of paper is laid out in regular array, some white, and others red; the former are the most numerous, and to them the most common simples are consigned, the crimson being reserved for those which are most powerful, or more highly esteemed, such as ginseng.

Surgeons dispense their own medicines, and local appliances, and do a little, what they can, in short, in way of medical prescription, to any who will apply for it. They hold nearly the place of the English general practitioner, but their shops are generally poorly furnished, and neither their employment nor profit is on a large scale.

The department of the Druggist is more lucrative than that of the Surgeon; for as the people are fond of physic, and they have no desire to balk the inclination, they not only give on every possible occasion, but give liberally. As an example of the latter disposition, it was observed that five balls, larger than marbles, to be taken at once, were prepared for some form of bowel complaint. It might be assumed that they did not possess very active ingredients; but how the patient, without the assistance of a probang, contrived to gorge them was the wonder. Men who should order or issue such perilous looking pellets in England, would be considered fit to deal with the diseases of horses only.

The Chinese Pharmacopœia, or rather Materia Medica, is a work of great magnitude; a brief epitome of it in the writer's possession extends to upwards of 1300 octavo pages.

Ginseng is the paramount promoter of health, and prolonger of life. It is said to possess astonishing power, not only of sustaining, but restoring the human frame, and is regarded with a degree of admiration bordering on religious adoration. No one's case need be considered desperate who can procure this, the *pabulum vitæ*, in abundance; but it is so costly, as to be beyond the reach of the great proportion of the afflicted. Generally it is, except in very small quantities, an article of sale by itself, the man who deals in it, dealing in nothing else; and it cannot be procured in every drug-shop. At Tinghae, the writer visited a ginseng repository, which was a most unpromising and barren-looking place. The commodity is too precious to be displayed at windows or deposited on shelves. Strong boxes behind a rampart of counters alone appear; there it is rigidly kept, disposed in small cases, each of which contains about a drachm weight. A stranger well introduced, or a person of known character, may look at, but not touch it, till he has paid the price. Proverbially it is represented as worth more than its weight in gold, which is confirmed by common practice; for the dealer alluded to asked, as a matter of course, for a bit shown, at the rate of twenty-five dollars an ounce.—*Ibid, from Dr. Wilson's Medical Notes on China.*

ART. XLIII.—ON THE CARDAMOMS OF ABYSSINIA.

By Jonathan Pereira, M. D., F. R S.

Two or three centuries ago, a large scitamineous fruit was employed in medicine, on account of the aromatic qualities of its seeds, under the name of *Cardamomum majus*. Cordus describes it as being a fruit like Melligetta, but smaller, turbinate like a pear, and having seeds which are[1] agreeably aromatic. The fruit, he says, has been erroneously confounded with the Melligetta, but the flavour of the former, he adds, is much less hot than the latter, and is grateful and pleasant; whereas the taste of Melligetta is very acrid, and like pepper. He furthermore tells us, that both the fruit and the seeds of Cardamomum majus are brought from Syria and Egypt.

This fruit has long since disappeared from commerce; but specimens of it are occasionally to be met with in some old collections of Materia Medica, and in that of Dr. Burgess, in the possession of the Royal College of Physicians of London, are several fine capsules of it, marked "*Cardamomum maximum Matthioli.*" One of these I have described and figured in the *Elements of Materia Medica*, p. 1026, fig. 195, 2d edit., and believing it to be identical with the *Amomum angustifolium* of Sonnerat and of Sir J. E. Smith, and the *Amomum Madagascariense* of Lamarck, I have adopted Sonnerat and Smith's name of *Amomum angustifolium*.

This cardamom is one of the fruits which, by some later writers in the Materia Medica, have been confounded with *Melligetta pepper* or *grains of paradise*.

About four years ago I received from my friend Dr. Royle some cardamoms which, he informed me, came from Abyssinia. In a letter which I have subsequently received from him, he says, that they were "brought strung on a string, and were sent to the India House by Major Harris's embassy. They were described as being carried to Abyssinia from Guraque, which is more to the southward, and where they might easily be produced. But I believe there is also some commerce up the rivers still further south, so that they might be produced even in Madagascar, and be sent as a spice to Abyssinia. But I should suppose they were more likely to be the produce of the interior, and probably of Guraque as they are called *Guraque spice.*"

These cardamoms I found to be identical with the fruit, which I had figured and described in my *Elements of Materia Medica*, under the name of *Amomum angustifolium.* The specimens, however, were scarcely so large as those I had previously seen, and were perforated for a string, apparently for the purpose of hanging them up to dry.

About a year and a half ago I received from Mr. Charles Johnston, the author of *Travels in Southern Abyssinia*, other specimens of the same fruit, and subsequently obtained from him the following information respecting them :—

"I hasten to answer your inquiries with regard to the cardamoms; and first of their place of growth. This I was given to understand was chiefly in the deep valley of the Abiah branch of the Bahr al Azzareeke, those you have received coming from that part of it which separates Guraque from Zingero. I have heard though, that, still further to the south, they are found in greater quantities, insomuch so, that the locality has received the name of the spice country, and as it was represented that extensive forests (? jungle) of the plant which produces them existed, we may presume, I think, that this land of spices is their indigenous country. As to the mode of preparing them for use, from the opportunities I had of observing the attention paid to cultivation in Abyssinia, I should suppose that it was the same in Guraque, and that the simple course of gathering the fruit, and drying them in the sun was all the inhabitants did to preserve the produce of their spice harvest. I must not forget though, that, for convenience of carriage and the usages of trade, each cardamom capsule is perforated and strung upon a strong thread in numbers varying from forty to fifty, for which, in the markets of Shoa, a distance of five day's journey, the priest merchants of Guraque can obtain one piece of salt-money, or about twopence-halfpenny in English money, but which, it must be observed, is sufficient to purchase at least two pecks of wheat in that country. The Abyssinians seldom use the cardamoms except for medicine. Its employment in domestic economy is certainly not so general as the nutmeg is with us."

Within the last few days I have received some specimens of the same fruit, under the name of *Korarima*, from Dr. Beke, to whom I am farther indebted for the following information respecting this cardamom:—

"The *Koraríma*, in Arabic called *Khêil* or *Khil*, is brought to the market of Báso, in Southern Abessinia, from the country of Túmhe, in Wallégga, an extensive level, and in great part desert region, which stretches from the river Dedhésa, the upper course of the Bahr el Azrek, or Blue River, as far as the Bahr el Abyad, or true Nile to the west, and the Gódjeb, a tributary to the latter now, to the south; northward it is bounded by the country of the Dínkas.

"The position of Túmhe is somewhere about 9° N. lat. and 35° E. long. Túmhe is usually known among the native merchants as "*the country of the Koraríma;*" and I have a map drawn by one of them in which it is so marked. But I was assured by others that it is not the growth of that country, but comes from other portions of Wallégga beyond it. As the land slopes westward from the high mountain country of Abessinia down to the valley of the Nile, I conclude that it is the produce of districts possessing an absolute elevation of probably not more than about 3000 or, may be, 4000 feet. This is in lat. 8° or 9° N.: nearer, that is higher up, than Túmhe it certainly is not found.

"The *Koraríma* is brought in considerable quantities by the way of Báso to Abessinia, in which country, as likewise among the Gallas further to the south, it is used as a condiment. I purchased at Báso one hundred heads for one *ámule*, a piece of rock-salt, of which about twenty are current there for one Austrian convention dollar, worth about 50d.—consequently forty for one penny sterling. As a stranger I probably paid the *full* price. It is also taken to Massòwah, the port of northern Abessinia, on the Red Sea, from whence it is exported to India. Dr. Rüppell was informed at Massówah that the annual export is of the value of one thousand dollars—about £200 sterling.

"The specimens sent you are not so large as some that I had; but I believe they are of a fair average size.

"I should add, that *Koraríma*, is the Galla name, which is likewise used in Abessinia. The accent is on the penultimate, and the vowels being sounded as in Italian, the name is pronounced as if written in English *Korahreema.*

"With respect to the Arabic name *Khíl* it should be remarked, that according to the Kamús, it means "Rue," or rather *Peganum Harmalah.* The word does not occur in Ibn Baítar's *Materia Medica*, and would appear indeed be to but little used by the Arabs. Nothing, however, is more uncertain than the real value of Arab names of plants, and several plants of very different characters, are no doubt to be met with under the same appellation. Nevertheless, the fact is certain, that at Massówah, and in the Red Sea, the *Koraríma* is designated *Khéil* or *Khíl*, by the Arabs."

This fruit is best distinguished from other large scitamineous fruits, with which it has been confounded by the characters of its seeds; which are devoid of the fiery peppery taste of the grains of paradise; are not highly polished, dark brown, and oblong, or ovate, or cylindrical, like the seeds of the *Amomum Clusii;* nor are they greenish grey or lead-coloured, like those of *Amomum macrospermum.* But they are mildly aromatic, somewhat smooth, compressed or angular, and pale olive brown.—*Pharm. Journ.*

ART XLIV.—ON THE PRE-EXISTENCE OF AN ESSENTIAL OIL IN STARCH.

BY M. PAYEN.

MANY years ago the author asserted the pre-existence of an essential oil in starch, which was denied by most chemists and especially by Liebig. In proof of the correctness of his view, he now brings forward the following experiments: —500 grms. of starch were gradually added to three litres of boiling water, which had been acidified with 0.005 sulphuric acid, contained in a vessel capable of holding 6 litres; the condensation was effected in an apparatus similar to that which the author has described in the separation of the aroma from coffee. About half a litre of water condensed in the first two recipients; in the third, towards the end of the operation, some cubic centimetres of water; and in the fourth, which was surrounded by ice, only a few drops. The water in the first two recipients possessed the odour of the starch, and was covered with a whitish pellicle, which dissolved in ether and solidified on cooling. The water of the third recipient had a very strong odour of starch, and was covered with a layer of essential oil; by uniting the collected essential oil the author obtained 0.08 grm. of it. It was liquid, yellowish, had a very strong odour of starch, and at all events a lower boiling point than that of water. The water poured from the oil still yielded 0.018 of oil; so that the starch contains at least 0.0001 part by weight of essential oil.—*Chem. Gaz. from Comptes Rendus.*

ART. XLV.—HISTORY OF THE INTRODUCTION OF GUTTA PERCHA INTO ENGLAND.

BY DR. WM. MONTGOMERIE.

HAVING in many late numbers of the *Mechanics' Magazine* seen frequent notices of the patents taken out for the application of the new substance, *gutta percha*, to various purposes, and its extensive usefulness becoming daily more apparent, it has occurred to me that as I was the person through whom the substance was first brought to the notice of the public, a few observations from me regarding it might be valued by many of the readers of your highly popular and useful journal.

I may not arrogate to myself the actual discovery of *gutta percha;* for, although previous to my introduction of it, it was quite unknown to Europeans, still it was known to a few of the inhabitants of certain localities of the Malayan forests; but even most of the native inhabitants of the towns and villages near those localities, to whom I showed it, did not know what it was, and it was likely to have remained unknown from the very trifling uses to which it was applied, being, as far as I could ascertain, only occasionally used to make handles for *parangs*, (wood choppers,) instead of wood or buffalo horn.

As far back as 1822, when I was on duty at Singapore as assistant-surgeon to the residency, I had obtained the *name* of it, while making inquiries relative to caoutchouc, of which there are several varieties; and some very fine specimens were brought me, particularly one called *gutta girek* (the *i* sounded as in Italian, and the *k* almost mute;) and I was told that there was another variety called *gutta percha*, and sometimes *gutta tuban*, which they said was harder than the *gutta girek;* but none of it was brought to me at that time, and I lost sight of it, having returned to the Bengal presidency. But being again sent on duty to the Straits settlements, and while at Singapore, in 1842, I on one occasion observed in the hands of a Malayan woodsman the handle of a *parang*, made of a substance which appeared quite new to me. My curiosity was excited, and on inquiry I found it was made of the *gutta percha*, and that it could be moulded into any form by simply dipping it in boiling water until it became heated throughout, when it became plastic as clay, and when cold, regained, unchanged, its original hardness and rigidity.

I immediately possessed myself of the article, and desired the man to fetch me as much more of it as he could get.

On making some experiments with it, I at once discovered that, if procurable in large quantities, it would become extensively useful; and even if only in small quantities, it would still be invaluable in the formation of many surgical instruments, particularly as a substitute for caoutchouc in many of the articles made of that substance, as I had found that those instruments which were made of caoutchouc, which had been dissolved in naptha, or other solvent, became speedily damaged, and totally useless in the damp and hot climate within the tropics. I therefore wrote to the Medical Board in Calcutta, strongly recommending its adoption, and sent specimens of the substance. After having examined it, the Board highly approved of my suggestion, and directed me to procure and send some of it to Calcutta, which was done.

I also addressed a communication to the Secretary of the Society of Arts, London, and sent some of the substance for investigation and analysis, for which, after my return to England, I had the honour to receive the Society's gold medal.

Being in bad health at the time the substance was brought under my observation, I was unable to prosecute the inquiry in the way I could have wished, not being able to go in person to the forest, and was therefore obliged to satisfy myself with such information as the natives could give me. I ascertained, however, that the tree producing it is one of the largest of the forest, growing to the size of three or four feet diameter; that the wood is of no value as timber, but that an edible concrete oil is procurable from the fruit, and often used by the natives with their food.

On extending my inquiries, I found the substance was quite unknown to the people at Malacca, although that place is only about a degree to the north of Singapore, and was told that the natives of the island of Sumatra did not know it; although at first I was inclined to suppose that the substance might have obtained its name from that island, the Malayan name for the island of Sumatra being "Pulo Percha."

I ascertained, however, that the tree was common in many places in the island of Singapore, and also in the forests of Johore, at the extremity of the Malayan peninsula; and was informed by the Buggese traders that it grew at Coti, on the south-eastern coast of the island of Borneo; and on requesting Mr. Brook to inquire about it at Sarawak, on the west coast, was informed by that gentlemen that it was found in the forests there also.

The following is a quotation from Mr. Brook's communication to me: "The tree is called *Niato* by the Sarawak people, but they are not acquainted with the properties of the sap; it attains a considerable size, even as large as six feet diameter; is plentiful in Sarawak, and most probably all over the island of Borneo."

I have reason to believe also that it is abundant on the thousand islands that cluster to the south of the straits of Singapore.

That it is very abundant is satisfactorily proved from the circumstance of its being now collected at Singapore to the extent of some hundreds of tons annually, although unknown to the public in 1842. But although the tree is at present sufficiently plentiful, yet the substance, I fear, will become soon more difficult to be procured, from the destructive mode pursued by the natives in obtaining it.

A magnificent tree of fifty, or more probably 100 years' growth, is cut down, the bark stripped off, and the milky juice collected and poured into a trough formed by the hollow stem of the plantain leaf; it quickly coagulates on exposure to the air; but from one tree, I was told that not more than 20 lbs. or 30 lbs. are procured.

I believe, however, that the juice may be obtained by tapping the tree, and that it might thus be made to produce in moderate quantities for many years; but this mode is too slow for the natives. Besides, although the first discoverer of a tree might be inclined to do so, the next who found it would, probably, cut it down, their being no property in the trees of the forest, excepting where grants of land have been given.

Allow me, now, to correct an erroneous mode of pronouncing the name, which I have observed used by many gentlemen with whom I have conversed on the subject. The word is a pure Malayan one, *gutta,* meaning the gum or concrete juice of a plant, and *percha,* the particular tree from which this is procured. The *ch* is not pronounced hard like a *k*, but like the *ch* in the English name of the fish perch. Had I thought there was a probability of the name being mispronounced, I might have used the uncouth orthography, per*t*sha, but it would have run the risk of being taken for a Russian or Polish name. Some of your readers may think I place too much value in a name; but in these days, when public attention is beginning to be attracted to the affairs of the "farther east," and the spirit of enterprise is leading many of our countrymen to explore those interesting regions, if one of them were to inquire of a Malay for gutta *perka,* he would be told the thing was unknown, when perhaps plenty of the *gutta percha* might be procurable by pronouncing the name properly.

Among the various uses to which it has been proposed to apply the *gutta percha*, I have observed some for which its properties render it peculiarly applicable, and one in particular, printing for the blind, for which the clear sharp impression it receives, and the toughness of the substance, admirably suit it, as well as in the formation of embossed maps for that unfortunate class.

As an application of it of minor importance certainly, but one of very general usefulness, it has been suggested to me that it would be found useful in stopping decayed teeth.—*Pharm. Journ. from Mechanics' Magazine.*

ART. XLVI.—CHEMICAL EXAMINATION OF GUTTA PERCHA.

By J. G. Scott.

Of the Honourable Company's Dispensary, Calcutta.

The *gutta percha* forwarded to the Medical board, by Dr. Montgomerie from Singapore, is one of those neutral vegetable substances, of which a proximate analysis cannot be made. On a careful examination, I have found it to possess the following properties:—

It is insoluble in water and in alcohol; soluble in volatile oils, and partially so in ether, from a solution of which it is precipitated by alcohol.

It melts when exposed to a temperature of 248°, and on cooling, remains in a semifluid adhesive state. When heated sufficiently in the open air it catches fire, burning with a strong yellow flame, and emitting much smoke.

On distillation it furnishes a volatile oil, similar in all its properties to *caoutchouc.*

It is insoluble in petroleum and in nitric ether.

The *gutta percha* is in thin films, varying in colour from a pale yellow to a pinkish tinge, and is destitute both of taste and smell. It is hard at a common temperature, but when immersed in boiling water, it softens so much, as to be capable of being beaten into a mass, and formed into any shape required; this, however, must be done immediately, for the mass on cooling becomes hard and unyielding.

When in a soft state, it can be stretched out into thin slips much beyond its usual length, but it does not recover its former bulk when the force is withdrawn. The slips are transparent and elastic.

I feel no hesitation in pronouncing the *gutta percha* a species of *caoutchouc*, possessing unquestionably some of its principal properties, but it is a species which I believe has not been examined before.—*Pharm. Journ. from Journal of the Agricultural aud Horticultural Society of India.*

ART. XLVII.—ON A NEW TEST FOR PRUSSIC ACID, AND ON A SIMPLE METHOD OF PREPARING THE SULPHOCYANIDE OF AMMONIUM.

By Professor Liebig.

When some sulphuret of ammonium and caustic ammonia are added to a concentrated aqueous solution of prussic acid, and the mixture heated with the addition of pure flowers of sulphur, the prussic acid is converted in a few minutes into sulphocyanide of ammonium. This metamorphosis depends on the circumstance, that the higher sulphurets of ammonium are instantly deprived by the cyanide of ammonium of the excess of sulphur they contain above the monosulphuret; for instance, if a mixture of prussic acid and ammonia be added to the pentasulphuret of ammonium, the solution of which is of a deep yellow colour, and the whole gently heated, the sulphuret of ammonium is soon decolourized; and when the clear colourless liquid is evaporated, and the admixture of sulphuret of ammonium expelled, a white saline mass is obtained, which dissolves entirely in alcohol. The solution yields, on cooling or evaporation, colourless crystals of pure sulphocyanide of ammonium. Only a small quantity of sulphuret of ammonium is requisite to convert, in the presence of an excess of sulphur, unlimited quantities of cyanide of ammonium into sulphocyanide; because the sulphuret of ammonium, when reduced to the state of monosulphuret, constantly reacquires its power of dissolving sulphur and transferring it to the cyanide of ammonium. The following proportions will be found to be advantageous:—2 oz. of solution of caustic ammonia of 0.95 spec. grav. are saturated with sulphuretted hydrogen gas; the hydrosulphate of ammonia thus obtained is mixed with 6 oz. of the same solution of ammonia, and to this mixture 2 oz. of flowers of sulphur are added; and then the product resulting from the distillation of 6 oz. prussiate of potash, 3 oz. of the hydrate of sulphuric acid, and 18 oz. water. The mixture is digested in the water-bath until the sulphur is seen to be no longer altered and the liquid has assumed a yellow colour; it is then heated to boiling, and kept at this temperature until the sulphuret of ammonium has been expelled, and the liquid has again become colourless. The deposited, or excess of, sulphur is now removed by filtration, and the liquid evaporated to crystallization. In this way from 3½ to 3¾ oz. of dazzling white dry sulphocyanide of ammonium are obtained, which may be employed as a reagent, and for the same purposes as the sulphocyanide of potassium. Of the 2 oz. of sulphur added, ½ an oz. is left undissolved.

The behaviour of the higher sulphurets of ammonium towards prussic acid furnishes an admirable test for this acid. A couple of drops of a prussic acid, which has been diluted with so much water that it no longer gives any certain reaction with salts of iron by the formation of prussian blue, when mixed with a drop of sulphuret of ammonium and heated upon a watch-glass until the mixture is become colourless, yields a liquid containing sulphocyanide of ammonium, which produces with persalts of iron a very deep blood-red colour, and with persalts of copper, in the presence of sulphurous acid, a perceptible white precipitate of the sulphocyanide of copper.—*Chem. Gaz. from Liebig's Annalen.*

ART. XLVIII.—ON THE CHANGES PRODUCED ON SOME DRUGS AND PHARMACEUTICAL PREPARATIONS BY THE SOLAR RAYS.

By Mr. Robert Hunt.

It has long been noticed that a peculiar change is frequently produced by the continued exposure of medicinal preparations to the influence of daylight, a change not merely in the colour of the article, but in its medicinal properties. To adduce a few instances, ginger (pulv. zingiberis Jam.) loses its fine yellow colour, and becomes white, with loss of its pungency. The powders of the leaves of hemlock (conium,) foxglove (digitalis purpur.) henbane (hyoscyamus,) &c., becomes a dirty yellow, and when this change has taken place, it is well known that no dependence can be placed upon these active drugs producing their peculiar influences on the system. The powders of the roots of jalap and ipecacuanha become pale, and, particularly the former, are rendered comparatively inert. The tinctures of cascarilla, catechu, kino, and frequently cinchona, deposit a considerable portion of the vegetable matter held in solution by the spirit on the side of the bottle exposed to the most light; the same result takes place with some others. In chemical preparations, many very remarkable changes take place, which need scarcely be particularized. The changes in oxide of silver, in oxide of mercury, and in nitric acid, have frequently been described. The effect of even diffused light on hydrocyanic acid is familiar to every Druggist, and there can be but few who have not observed alterations in the character of the peroxide of mercury (red precipitate) and the chloride of mercury (calomel) by the action of the sun's rays. The bleaching of the fixed oils and of wax need scarcely be mentioned, but the influence of light upon the resins, with the exception of guaiacum, was never pointed out until the publications of M. Niepce's photographic researches.

I am not aware that any investigations have been made into any of these changes: I am therefore induced to trouble you with a few remarks, the results of experiments which have extended over some years, and which, although far from complete as a scientific investigation, have the merit of some practical and really important applications. I shall not detail my experiments, which have been very numerous and frequently repeated, but, for the present at least, content myself with giving the general results of these researches.

It will be necessary, however, to describe the mode adopted by me in this examination, and the various conditions under which the experiments were made. Having selected the bright green powder of the leaves of the medicinal plants, carefully dried in the dark, and powdered by myself, it was placed in dry and warm glass tubes, and these were then hermetically sealed. Some of these tubes were placed aside in a dark cupboard to serve for comparison with those exposed to light; other tubes of powder were now exposed, day after day, to the action of the rays of a prismatic spectrum, which was maintained in a fixed position, by means of a good heliostat. The tubes were so placed across the spectrum, that each tube was kept under the influence of a particular ray. Although I frequently placed seven tubes in the seven rays of the spectrum I generally used only three, for the following reasons. Sir David Brewster considers that there are but three primitive colours in the solar beam—red, yellow, and blue; and that all the other colours are but compounds of those rays with each other. My researches have proved to me that the three great phenomena of the solar radiations—LIGHT, HEAT, and CHEMICAL ACTION—have their points of maximum power in three distinct parts of the spectrum; the red rays giving the largest amount of calorific power, the maximum intensity of light residing in the yellow rays, and the chemical power being greatest in the blue rays. It will, therefore, now be seen that by using three tubes only, the vegetable powder under examination was exposed to the influence of the heat of the suns ray's—to their light—and to their chemical, or, as I have proposed to term it, ACTINIC power. By this arrangement I soon ascertained that the decolorization of green vegetable powders was not due to the influence of LIGHT, as the powders exposed to the full intensity of yellow light, in which we have the maximum of luminous influence, underwent no change—the alteration of the colour was in nearly all cases, but not in all, first set up under the influence of the red rays. No great difference could, however, be detected between the action of the red and blue rays. Hence we learn, that the change in question is due to the action of the heating and chemical principles of the sun's rays. By using two spectra, and so arranging them that the blue ray of the one fell on the space occupied by the red ray of the other, we are enabled to examine the combined action of these rays—and I have always found the result to be a very rapid bleaching of all green vegetable powders. The bleaching of the brown and yellow powders —jalap, bark, and ginger, is due almost entirely to the blue or chemical rays. The chemical examinations which I have made of the bleached powders, appear to show that an absorption of oxygen takes place under the action of the chemical rays—but that the heat rays exert their power principally, if not entirely, in removing an atom of combined water.

It will not be difficult to understand how very important the changes effected in the constitution of the organic body must be, when we consider the very great differences in medicinal effects produced in chemical compounds, by the addition or subtraction of an atom of oxygen or of water.

These remarks and results apply with equal force to the resins and the fixed oils. The bleaching of the fixed oils appears to depend almost exclusively on the action of the blue and indigo rays of the spectrum, and although the thermic rays produce a little effect upon the resins, it is in no respect to be compared to the action of the actinic rays, which appear to liberate a portion of oxygen, by which, solarized is rendered much more soluble than unsolarized resin. The conversion of linseed oil into a substance resembling caoutchouc under the influence of the air, is very materially modified by the action of the sun's rays, the blue rays accelerating the absorption of oxygen, and the yellow and red rays retarding it.

All the changes which have yet been examined upon the salts of the metallic oxides, appear to be due entirely to the influence of the blue and violet rays, and the alterations in colour and character are dependent upon the liberation of one atom of the gaseous element from the compound. The phenomena connected with these changes are now under investigation by the author of this paper, and will shortly be published in another form.

The decomposition of the hydrocyanic acid under the influence of the solar radiation is also due to the chemically active rays, and I have found that the change has been effected more speedily in the blue and indigo rays than in any others. We have in this case the formation of ammonia, and the precipitation of a brown powder which appears to be a compound of nitrogen and carbon.

Such is a general outline of the results to which my researches have at present led me. It is a very common practice for Druggists and manufacturers to put those pharmaceutical preparations which are liable to change by light into dark purple coloured bottles, or to cover white glass bottles with blue paper, with the idea that the quantity of *light* admitted is then so small that no change can take place. We learn from these investigations, and the knowledge is of great practical importance, that no plan more efficient for producing rapid decomposition could be adopted than the use of blue glass bottles. Light positively acts as an interfering agent—this light is obstructed by the dark blue glass, and the pure or nearly pure chemical rays are permitted to act on the preparations with all their energy. If instead of using those kinds of bottles, others prepared of a neat form from the ordinary dark green bottle glass were adopted, there would be but little fear of any decomposition from the solar radiations. Not only does this kind of green glass obstruct the rays of light to a great extent, but nearly all the calorific rays are shut off, and the actinic or chemical rays are reduced in quantity and force in a very remarkable manner.

For bleaching oils there can be no question but purple bottles would be by far preferable to any other colour for the reasons above explained.—*Pharm. Journ.*

XLIX.—RESEARCHES IN ANIMAL CHEMISTRY.

By Prof. J. Liebig.

I have latterly made a series of researches on the nature of fluids, which belong neither to the sanguineous nor lymphatic vessels. The Academy will permit me to draw its attention to the results I have obtained. We know long since that the meat of animals recently killed presents a reaction decidedly acid. M. Berzelius has attributed this property to the existence of lactic acid, without, even to the present moment, analytical results having proved the fact in an irresistible manner. Many chemists have admitted the existence of lactic acid in the urine, in the gastric juice, and in the milk, but they supported the conclusion of its existence in those liquids, on reactions which do not possess great certitude. Even the opinion that lactic acid hinders the precipitation of oxide of copper by the milk of lime, rests on an error. M. Strecker has lately shown that the lactate of pure copper is perfectly decomposed by the milk of lime, and in the supernatant liquid, no reaction demonstrates the presence of oxide of copper. It is true that the lactate of pure lime dissolves a trace of oxide of copper; but a slight excess of lime water precipitates it entirely.

My researches have aimed at putting an end to this incertitude in respect to the non-volatile organic acid, which constitutes a part of the animal organism.

When the flesh of animals recently killed and beaten into a pulp is washed with cold water, a red liquor is obtained, which, heated to ebullition, gives a coagulum of albumen, and is almost entirely deprived of colour. The limpid liquid, scarcely yellowish, obtained in this manner, possesses a very decided acidity and a very aromatic and agreeable flavor of boiled beef. When neutralised by barytes water, there is precipitated phosphate of barytes and phosphate of magnesia; it becomes slightly alkaline, without any barytes remaining in solution.

After the separation of these precipitates, we can withdraw, by a suitable evaporation, crystals of créatine, discovered by M. Chevreul in boiled meat.

Pushing the concentration further, there is formed in the syrupy liquid acicular crystals, which separated by the filter, and purified by new crystallisations, presents white spangles of a very brilliant pearly lustre, and soluble with difficulty in alcohol. The liquid, separated from its crystals, changes into a thick mass formed of the syrupy mother-liquor and fine crystals, grouped concentrically, very soluble in alcohol, and even in a mixture of alcohol and ether. These two crystalline matters are salts with bases of potash and lime combined with new acids, containing nitrogen.

The latter mother-liquor contains lactate of potash. To extract the free lactic acid, I treat this mother-liquor with alcohol, and I add oxalic acid equally dissolved in alcohol. I thus obtain the separation of the potash in the state of oxalate of potash, I then add ether as long as the liquid is turbid. By these means, I separate divers other matters, and the alcoholic solution retains the lactic acid, susceptible now of giving, with hydrated lime, lactate of lime, which allows the lactic acid and the other lactates to be obtained.

In submitting to analysis the lactate of lime and that of zinc prepared by these various methods, I have obtained for the first the formulæ of $C^6 H^5 O^5 + Ca O \times 4$ Aq.; the lactate of zinc has given me $C^6 H^5 O^5, Zn O + 2$ Aq.

These results will no longer leave the least doubt on the nature of the non-volatile organic acid spread in the animal organism; they explain the rapid reaction of the muscles, and now that we know that in such an extent of the bodies of animals there exists a liquid acid which is only separated from an alkaline fluid (the blood and lymph) by very thin membranes, we may, I believe, explain many electric phenomena observed by M. Mattéucci, and other physiologists on the bodies of dead animals.

Having operated on hundreds of pounds of meat, I have obtained a sufficient quantity of créatine to be able to submit this substance to a thorough examination.

Its physical properties have been given with such precision by M. Chevreul, that I can add nothing to the description given by this illustrious chemist. I think I can conclude from my experiments that créatine makes part of the flesh of all animals. So far as I have gone I have shown it to exist in the flesh of beef, veal, mutton, pork, horse, hare and goat. The beautiful discovery of this able observer becomes still more important, since we cannot doubt that créatine plays a great part in the vital actions. It is at least certain that the *bouillée* of meat cannot be replaced either by gelatine, or by any other liquid extracted from another part of the organised animal, unless from the muscles. I have found créatine in the heart of the ox, but not in the brain, the liver, the lungs, or the kidneys.

Créatine belongs by its crystallisation to the clinorhomboïdal system; it forms tolerably large crystals, clear, transparent, and of great beauty; they lose at 100 degrees, 12.18 for an 100 of water, which corresponds to two atoms.

The results of numerous analyses have given me as the composition of crystallised créatine, the formula $C^8 N^3 H^{11} O^6$.

Créatine is a neutral or indifferent body, which dissolves in alkaline liquids or weak acids, and may be again withdrawn without having undergone any change, but in presence of acids or concentrated caustic alkalies, its properties are changed.

In presence of energetic acids, créatine is transformed into an organic base, possessing very remarkable properties. The matter combined with the acid is no longer créatine, and can no more be transformed into this body; it is a new body, which I shall designate *creatinine*, and which is formed in the presence of muriatic and sulphuric acids by the displacement only of four atoms of water. Analysis has given me for créatinine the formula $C^8 N_3 H_7 O^2$. Créatinine is much more soluble in water and in alcohol than creatine. Its solution in water *has a caustic taste like ammonia.* It changes to blue the red litmus paper; it combines with all the acids and forms salts of great beauty; its salt of platina is remarkable for the largeness of its crystals and their beautiful yellow golden colour. The formula just mentioned expresses the quantity which combines with one equiv. of acid. The crystals of créatinine belongs to the monoclinometric system—they are voluminous, colourless, and very shining.

Créatine contains the elements of glycocolle (sugar of anhydrous gelatine) with one atom more of ammonia; the créatinine, those of caffeine, with one atom more of amide.

I will add, that forty lean fowls have furnished me with about 24 grammes of créatine; 56 pounds of beef 16 grammes; and 100 pounds of horse-flesh 36 grammes.

The extracts of all the meats on which I have operated, evaporated to dryness and calcined to redness, leave a white ash containing only phosphates. The liquids furnished by the flesh of beef and of the horse leave a mixure of phosphate of alkalies (of potash and of soda,) precipitating the salts of silver yellow, and the pyrophosphate of soda and of potash precipitate them white. The flesh of fowl leaves pure pyrophosphates.

The relation of the salts of potash and of soda in the liquids of flesh and in the blood are very different. For 1 equiv. of potash the blood of the ox contains 10 or 12 equivs. of soda; this relation is inverted in the watery extract of the flesh of the same animal. The blood of the horse contains for 1 equiv. of potash 3.62 equivs. of soda; for the same quantity of soda, the flesh of the same horse contains 6.9 equivs. of potash. These relations will conduct to some important conclusions, if we remember that in milk they are the salts of potash which predominate. If a salt of soda (a phosphate of soda) is really and indispensably necessary for the constitution of the blood of many animals, it will follow that the addition of chloride of soda to the nutriment of these animals is as necessary and indispensable for all places where the forage food does not contain either the phosphate or the other salts of soda, as is the case in many of the localities of Germany.

We may easily conceive that the chloride of soda, by a reciprocal decomposition with the phosphate of potash (which predominates in our wheat grain, &c.) may furnish phosphate of soda and chloride of potash; and this latter salt is never deficient in the liquids of the flesh.

Not to encroach on the time of the Academy, I will end my observations here, in referring for a more lengthy detail to a pamphlet actually in the press. I shall only add that créatine, by a prolonged ebullition with very concentrated barytes water, separates itself into urea (or into carbonate of barytes and into ammonia), into a new organic base, which forms a salt with sulphuric acid, which crystallises in pearly spangles resembling chlorate of potash, and into a new crystallisable acid, which I have not studied through want of a sufficient quantity.

In terminating this paper I will mention some facts observed in my laboratory, and which I deem worthy of attention.

M. Henneberg, one of my pupils, has found that the blood of fowl contains silicate of potash, or of soda, which explains the existence of the enormous quantity of silica remarked in the feathers of birds.

M. Dorter Bensch, my *preparer*, has shown that the milk of the three bitches fed with milk during twelve, fifteen, and twenty-seven days, contains sugar of milk perfectly crystallisable.

To conclude, M. Gugelberger, another of my pupils, has obtained by the distillation of casein or of gelatine with the peroxide of manganese and sulphuric acid, pure aldehyde and essence of bitter almonds, both in sufficiently large quantities to be able to demonstrate this remarkable fact by analytical results.—*Chemist.*

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

At a stated meeting of the Philadelphia College of Pharmacy, held Ninth month 28th, 1846,

DANIEL B. SMITH, President in the Chair,

The following Report presented by Warder Morris, Chairman of the Committee on Finances, was accepted, and the committee discharged, with the thanks of the College for their services.

The committee appointed in 1844 on the finances of the College, have the satisfaction to report that they have at length brought the business intrusted to them to a conclusion. The debt of the College at the time of their appointment was $7,800, which was held chiefly by members of the College. Its inability to pay the interest on this debt would soon have rendered the College bankrupt, and the committee feel proud of the liberality and public spirit with which the members have responded to the appeal made to them. Twenty-six shares amounting to $2600, have been assigned to the College, and donations in money to the amount of $242 have been received in aid of the Institution. In addition to this sum there have been paid over to the committee by a resolution of the College, $100 of the monies in the hands of the committee of publication, $116 proceeds of the sales of directions for patent medicines, and $392 from the sale of Latin labels, and with these sums they have been enabled to purchase twenty shares of the loan. They have also received from the committee on the latter subject, seventy-five books of Latin labels, with which they have purchased two additional shares, making in all forty-eight shares which they have extinguished—thus relieving the College from the annual charge of $288. The committee flatter themselves that this timely aid will not only enable us to meet our engagements, but to form a sinking fund for the extinguishment of the debt. The unavoidable annual expenses of the College may be thus estimated.

Ground rent to A. Miller, - - -	$225
Interest on $3000 loan at 6 per cent. -	180
Taxes, - - - - - - - -	65
Lighting and warming Hall, &c. - -	110
Advertising Lectures, - - - -	20
Serving notices, &c. - - - -	40
Total	$640

The income of the College will probably not vary greatly from the subjoined estimate :

Annual payments of 70 members, - -	$350
Rent of cellar, - - - - - - -	75
Rent of 3d story, (vacant at present) - -	75
" 4th " - - - - - -	75
Temporary rental of rooms, - - -	70
Diplomas, - - - - - - -	30
Matriculating tickets, - - - -	15
Tax on Professors, - - - - - -	75
Total	$765

In making these estimates nothing has been allowed for repairs, and it is probable that an amount equal to the rent of the third story room for two years, must be applied within that time to this purpose. As there can be little doubt of our being able to rent the room, the committee think that there is every reason to believe that the income will more than defray the expenses of the College. In estimating the amount of annual payments at $350, the committee have supposed that those members who have relinquished stock to the amount of $100 and upwards, would be exempted from the annual payment. This exemption was stipulated for in several instances, and it seems but just to extend it to all alike. There is due on account of interest up to the first of this year, the sum of $500, and the Treasurer having $400 in his hands, the committee have authorized him to pay the arrearages. The committee further suggest that the profits on the printing of the Journal, the Labels and Directions, together with all that can be spared from the general income, be appropriated as a sinking fund for the payment of the debt. They further suggest an application to the Legislature to exempt the Hall of the College from taxation, all which is respectfully submitted. Signed,

Warden Morris,
Thomas P. James,
William Procter, Jr.
Charles Ellis,
Ambrose Smith.
Samuel F. Troth,
Joseph C. Turnpenny,
Daniel B. Smith,
Dillwyn Parrish,

In accordance with a suggestion in the said report, the following named members of the College, having generously relinquished to the College from one to five shares of its loan, each valued at $100 per share, it was resolved that,

Peter Lehman,
Charles Ellis,
Dr. George B. Wood,
Algernon S. Roberts,
John Price Wetherill,
Edward Roberts,
Dr. William Wetherill,
Edward Needles,
Warder Morris,
Alexander Fullerton,
Dillwyn Parrish,
Samuel P. Shoemaker,
Daniel B. Smith,
Frederick Brown,
Charles Shaeffer,
Thomas H. Powers,

be exempted from any further annual contribution to this Institution. Of this resolution the Secretary was directed to inform them. On motion of Warder Morris it was resolved, that a committee on the sinking fund be annually appointed at the time of the election for officers, whose duty it shall be to invest such sums, as may from time to time be placed at their disposal, in the purchase of the debt of the College. Also,

Resolved, That the sum of fifty dollars annually from the profits of the Publication committee, the profits of the committee on Latin Labels and Patent Medicine Directions, together with the amount received from the Professors, be annually paid over to the committee on the sinking fund. Warder Morris, Samuel F. Troth, and J. C. Turnpenny, were appointed the sinking fund committee until the next annual election.

The proposal submitted at the last stated meeting, to alter Law 5, Section 1st, by striking out "The number of Resident Members shall not exceed one hundred," was considered and adopted. The College then proceeded to the election of eight members of the Board of Trustees, to serve for one year in the place of those whose term expires this evening, and the following gentlemen were duly elected.

Thomas P. James.	H. W. Worthington,
Jacob L. Smith,	Robert Shoemaker,
A. J. L. Duhamel,	William J. Jenks,
James L. Elliott,	Caleb H. Needles.

Then adjourned.

At a stated meeting of the College, held Third month, 29th, 1847,

Daniel B. Smith, President in the Chair,

The minutes of the Board of Trustees were read and adopted. Henry Pemberton, Francis [redacted], and Edward Needles, were recommended by the Trustees as suitable candidates for Resident Membership, and on motion the College proceeded to their election. The Tellers reported they had received the requisite number of votes, and they were accordingly declared members of the Philadelphia College of Pharmacy. The committee appointed to assist the secretary in preparing for publication the Constitution of the College, and a revised list of its members,

Report, That they have prepared from the minutes the amended Constitution, and a revised list of members, which is now ready for publication. By the minute of their appointment, they are authorised to publish the document and they would suggest the propriety of furnishing each member with a copy. All which is respectfully submitted.

SAMUEL F. TROTH,
WILLIAM PROCTER, JR. } *On behalf of the Com.*

The following resolution, after some interesting discussion, was on motion adopted:

Whereas, a Convention will assemble in the city of Washington in May, 1850, for the purpose of effecting a revision of the United States Pharmacopœia, to which this College of Pharmacy is authorized to send delegates,

Resolved, that a committee of the College be appointed to take into consideration the proposed revision, and report upon such changes and amendments as may appear proper. The report to be submitted to the College at least six months before the sitting of the Convention.

The following members were apppointed to carry out the resolution:

Daniel B. Smith (Chairman,)
William Procter, Jr.
William J. Jenks,
John H. Ecky,
Robt. Bridges, M. D.
Thomas P. James,
Dillwyn Parrish,
William Hodgson, Jr.
Jacob L. Smith,
Ambrose Smith,
Charles Ellis,
Henry W. Worthington,
Edward Parrish,
Joseph C. Turnpenny,
Joseph Carson, M. D.

The committee on the Publication of the Journal made a report, of which the following is an abstract.

The receipts on behalf of the Journal since last report, including a balance on hand of $280.14, were		$833 03
Cash paid for printing 4 numbers, including materials, &c.	$325 06	
Do. Report of College, &c.	18 17	
Do. Editing Journal for one year,	150 00	
Other expenses including cash advanced to College,	171 69	664 92
Balance in hands of Publishing Committee,		$168 11

The committee expressed the desire that a more active interest should be taken by members of the College, both in the circulation of the Journal, and in original contributions to its pages.

Considerable interesting discussion ensued, in which the College was reminded that our Journal is the sole organ of Pharmacy in this country, and that it is conducted on a liberal basis, which should ensure the confidence of Pharmaceutists in different sections of the country.

The committee of Publication were encouraged to adopt such measures as in their judgment are best calculated to advance the interests of the periodical.

On motion the College proceeded to the annual election of officers. The following named gentlemen having received the requisite number of votes, were declared duly elected for the coming year.

President.
Daniel B. Smith.

1st *Vice President.*
Charles Ellis.

2d *Vice President.*
Samuel F. Troth.

Treasurer.
Joseph C. Turnpenny.

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Then on motion adjourned.

From the Minutes,

DILLWYN PARRISH, Secretary.

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AUGUST, 1847.

ART. L.—DRIMYS WINTERI, *Forster*, *De Candolle*. (Winter's Bark Tree.) With a Figure.

By Joseph Carson, M. D.

Sex. Syst.—Polyandria, Polygynia.

Gen. Char.—See D. *chilensis*, in last number.

Specific Char.—Leaves oblong, obtuse, glaucous beneath. Peduncles simple, approximated or very short, divided into elongated pedicels.—*(De Candolle, Prodromus.)*

Winter's Bark was brought before the medical profession in a paper read to the Medical Society of London, in 1779, by Dr. John Fothergill. It is contained in the fifth volume of "Medical Observations and Inquiries." In this paper is a history of the discovery of the tree, with a botanical account of it drawn up by the celebrated Dr. Solander. It appears that the tree and the bark were unknown, until the return of Captain John Winter from a voyage to the South Seas in 1579. Captain Winter was the commander of the ship Elizabeth, which sailed with Sir Francis Drake in 1577; but after having passed through the Straits of Magellan, on the 8th of October of the following year, was obliged by stress of weather to return to the Straits, and remaining there some time procured the bark which Clusius in honour of him named *Cortex Winteranus*.

Other navigators upon visiting the Straits noticed the tree, but nothing definite was known of its botany, until, in 1691, a Mr. George Handasyd, upon his return, presented some specimens to Sir Hans Sloane, who gave a description and figure in the Philosophical Transactions. But it appears that the flowers and fruit were wanting, and a systematic location was impossible, until, in 1768, Capt. Wallis, of the Dolphin, brought some perfect specimens, which came into the hands of Dr. Solander, who, from these and his observations when staying at Terra del Fuego, drew up his description.

"Winter's Bark Tree (*Winterana aromatica*) is one of the largest forest trees upon Terra del Fuego; it often rises to the height of fifty feet. Its outward bark is on the trunk gray, and very little wrinkled; on the branches quite smooth and green.

"The branches do not spread horizontally, but bend upwards, and form an elegant head of an oval shape.

"The leaves come out without order, of an oval, elliptic shape, quite entire, obtuse, flat, smooth, shining, of a thick leathery substance, evergreen; on the upper side of a lively deep green colour, and of a pale bluish colour underneath, without any nerves, and their veins scarcely visible; they are sometimes narrower near the footstalks, and there their margins are bent downwards.

"In general the leaves are from three to four inches long, and between one and two broad; they have very short footstalks, seldom half an inch long, which are smooth, concave on the upper side, and convex underneath. From the scars of the old footstalks the branches are often tuberculated.

"The peduncles or footstalks for the flowers, come out of the axillæ foliorum, near the extremity of the branches; they are flat, of a pale colour, twice or three times shorter than the leaves, now and then support only one flower, but are oftener near the top divided into three short branches, each with one flower. The bracteæ are oblong, pointed, concave, entire, thick, whitish, and situated at the basis of each peduncle.

"*Calyx or flower cup* it has none, but in its place the flower is surrounded with a spathaceous germ, of a thick leathery substance, green, but reddish on the side which has faced the sun; before this germ bursts, it is of a round form, and its size is of a small pea. It bursts commonly, so that one side is higher than the other, and the segments are pointed.

"The *corolla* consists always of seven petals, which are oval, obtuse, concave, erect, white, have small veins, and are of an unequal size, the largest scarcely four lines long; they very soon fade and drop off, almost as soon as the germ bursts.

"The *filaments* are from fifteen to thirty, and are placed on the flat end side of the receptacle; they are much shorter than the petals, and gradually decrease in length towards the sides.

"The *antheræ* are large, oval, longitudinally divided into two, or as if each was made up of two oblong antheræ.

"The *germina* are from three to six, placed above the receptacle, turbinated or of the shape of an inverted fig, flat on the inside and somewhat higher than the stamina; they have no styles, but terminate in a stigma which is divided into two or three small lobes."

The fruit was not seen by Dr. Solander in a ripe state, but in the immature condition is described as constituted of germs of a thick, fleshy substance, becoming unilocular seed vessels, and containing the rudiments of seeds, as in the generic account.

Captain Wallis stated that the trees are of various sizes according to the soil they grow upon and their situation. Those near the sea and in rocky ground were scrubby, the bark sticking close to the wood, and having a dirty look;

those on the plain ground and sheltered were straight and tall, rising to thirty or forty feet, and as thick as a middle-sized man. The bark is smooth and somewhat resembling the horse chesnut. In the neighborhood of Port Famine it is abundant. It flowers in March, which is the commencement of the fall. The bark attracted the attention of navigators from its warm, spicy, aromatic properties, and in the treatment of scorbutic diseases, which broke out in vessels going into the Straits of Magellan, was a valuable auxiliary. It is rarely brought into the market as a drug, but is sometimes confounded with the Canella alba from which it differs in colour, as it is pale-yellowish or dull-reddish gray, with elliptical dull-brown spots externally, and brown internally. It has an aromatic odour and a warm bitterish taste.

It contains resin, volatile oil and tannin, which last serves to distinguish between it and Canella, as the chemical evidences are present in one case and not in the other.

The medical properties of it are those of an aromatic and tonic. From its sensible qualities it was confounded with Canella alba. The medical uses are the same.

Some confusion is apparent among the authors who have treated of the tree with respect to its name; hence the different appellations by which it has been described. The generic term Winterana was bestowed by Linnæus in commemoration of its discoverer; in so doing, however, he mistook it for the Canella alba, and gave the account of the fructification of that plant. Browne, however, had stamped that genus with the name of Canella. Forster, having obtained the parts of fructification, gave to the plant the name of Drimys Winteri from its hot and pungent flavour. Murray, in his *Linn. Syst. Veg.*, gave the generic name Wintera, which he preferred to the original Linnæan one, and finally De Candolle has adopted the name of Forster in imitation of Lamarck.

By Lamarck a species has been made which he calls D. punctata, but which by De Candolle is regarded as a variety.

ART. LI.—OBSERVATIONS ON PODOPHYLLUM PELTATUM.

By John R. Lewis.

(*An Inaugural Essay.*)

The subject of this essay is among the most interesting of our indigenous Materia Medica, and has long attracted the attention of medical men for its active and efficient power as a cathartic; and were it not for the presence of a foreign drug in our market, possessed of similar and more active powers, there is little doubt but that the root of Podophyllum would attain a more prominent reputation as a purgative than it at present enjoys.

Its adoption in the United States Pharmacopœia, and the formula for the extract of it which there exists, are acknowledgements of its merits not to be disputed. Its chemical history has hitherto been but little examined into. Several years since Mr. Wm. Hodgson, Jr., of this city, in some experiments on this plant published in the American Journal of Pharmacy, describes a peculiar bitter principle existing in its root, which he obtained by boiling the drug with quick lime in water, and other subsequent treatment, but which he did not succeed in obtaining in a state of purity.

In the investigations detailed in the following pages, I have pursued the path pointed out by Mr. Hodgson as well as followed such indications as my own experience has suggested, which have thrown some light on the chemical relations of the Podophyllum, and shown a striking analogy between it and Jalap.

BOTANICAL HISTORY.

Podophyllum Peltatum.

Common names.—May Apple, Mandrake, Wild Lemon.

Sexual System.—Polyandria, Monogynia.

Natural Order.—Ranunculi, *Jussieu.*

PODOPHYLLEÆ, *Lindley*.

May Apple is an indigenous herbaceous plant, thriving in swampy, low, shady woods, being particularly adapted to rich and shaded soil, growing in patches close together, and sometimes covering a large extent of ground. The flowers, which are nodding and white, appear in May and June, are situated in the forks of the petioles at the top of the stems, having a corolla composed of about nine petals, and a calx of three oval concave leaves. The stamens number from twelve to twenty, surmounted by long yellow anthers. The stigma is sessile.

The stalk which is about twelve or sixteen inches high, supports two palmate leaves which are of a green colour, smooth on the top, veined and hairy on the under surface, and generally wither as soon as the fruit is matured. The fruit is a yellowish drupe about the size of a small hen's egg, resembling in shape and colour the fruit of Citrus limonis, from which it has derived the name of Wild Lemon.

The rhizoma, which is the only officinal part of the plant, is a long creeping jointed horizontal fleshy root; the joints which are much thicker than the other portions of the root are furnished with radicles of the same colour. In the dry state when broken it exhibits a whitish amylaceous fracture: externally it is of a reddish brown colour, corrugated and wrinkled lengthwise, has a bitter taste, and somewhat aromatic odour. It should be collected in the fall after the leaves and stalks are withered, or in spring as soon as the shoots are perceptible—the former is perhaps preferable, as the medical properties of the root, by its being in the ground all winter, are more or less subject to deterioration.

The decoction and tincture are very bitter; alcohol is the best solvent for the bitter principle, but diluted alcohol takes up a greater amount of extract, although it is much weaker in proportion to its bulk, therefore alcohol of 35° Baumé is preferable to any other menstruum for the extract, as it affords the same quantity of active principle, in a much smaller bulk. Sixteen ounces of the fresh root loses in drying 11½ ounces of its weight, consequently 100 lbs. of the fresh, would yield 28 lbs. of dry root. Great care should be taken to exclude moisture from the dried root, as in this state it is deliquescent. The fresh root should be dried in the sun.

CHEMICAL HISTORY.

Vegetable Albumen.—An ounce of the fresh root was beaten into a pulp, with a portion of water, and the fluid separated by filtering. This liquid was precipitated of a dirty white colour by bichloride of mercury and ferrocyanide of potassium, and when heated to the boiling point a coagulum was produced, which, taken in connection with the two preceding tests, indicates the presence of vegetable albumen. This albuminous matter appears to be rendered insoluble by drying the root, as the cold infusion yields no evidence of its presence to the tests mentioned.

Gum.—Another portion of the decoction was precipitated by the solution of subacetate of lead of a dirty yellow colour; the precipitate when dried assumed a reddish brown hue. A cold infusion of the dry root coarsely powdered, was made, filtered, and tested for albumen, from which it proved to be perfectly free. To this infusion a solution of subacetate of lead was added, which produced a dirty yellow curdy precipitate, which did not change its colour like that in the preceding experiment. Another portion of the infusion was mixed with its bulk of alcohol, which caused a precipitate of the same colour.

Starch.—The decoction made with one ounce of May apple root to a pint of water, was precipitated of a dark blue colour by tincture of iodine.

Gallic Acid.—The presence of tannin in the decoction was not indicated on the addition of gelatin; but by the solutions of the per salts of iron a dark colored precipitate was thrown down, indicative of gallic acid.

Fixed Oil.—Four ounces of the coarsely powered root was macerated during 48 hours in alcohol of 35° Baumé, heated to the boiling point, and then displaced with the same menstruum. The tincture thus obtained of a beautiful colour, resembling dark Madeira wine, was evaporated to a nearly dry extract, which weighed 250 grains Troy. This extract was treated with cold ether, which yielded on evaporation 98 grains of a mixture of fixed oil, and a resinous substance of a light yellowish olive colour. When pressed between bibulous paper most of the oil was absorbed, and the resinous substance was left in a dry brittle state, breaking with a shining fracture. The fixed oil has a greenish yellow colour, and becomes rancid by exposure for some time to the air. The resinous substance was dissolved in alcohol and evaporated to an extract, which possessed quite a different appearance, than when it contained the fixed oil,—having a brown colour, extremely bitter taste, soluble in alcohol and ether, and partially soluble in hot oil of turpentine. It burns readily, leaving a carbonaceous matter, and gives off much smoke.

Ethereal Treatment.—A portion of the root in powder was macerated with a sufficient quantity of ether requisite for its exhaustion, the liquid when evaporated yielded an oily extract of a yellowish-colour with a slightly olive tint; this was treated with cold alcohol of 35° Baumé, which dissolved the solid portion, leaving the fixed oil in the form of globules in the bottom of the solution. This latter was separated by decantation, the oil which was collected in a watch glass was moderately heated to drive off the adhering alcohol. The oil now was of a dull olive colour, about the consistence of castor oil, with no taste, but had a slight odour which was due to impurities, it was unctuous to the touch, left a permanent stain on paper, was soluble in a solution of caustic potash, and when precipitated from this solution by the addition of muriatic acid, a substance rose to the top of the liquid which had all the appearance of an oil after being treated in that manner. When burnt it exhales the disagreeable odour of burning fat, and leaves a slight residue scarcely perceptible. This oil resembles that obtained by the alcoholic treatment in all its properties; it is soluble in hot alcohol and in cold ether.

Volatile Oil.—One pound of the fresh root was macerated in a sufficient quantity of water to cover it, for twenty-four hours, and distilled. The product was opaque, possessed the odour of the root, and had a mild nauseous taste. Twenty ounces of the dried root was macerated in the water obtained in the previous process for two days, and again distilled; the product had the same appearance and odour, but it was much stronger than that procured by the former distillation. It was kept in a closely stopped bottle for five months without the least apparent change in its character, except that it became more floculent, and separated in very light opaque scales. It was neutral to test paper.

A peculiar Resinous Principle.—A portion of the coarsely powdered root was macerated twenty-four hours in alcohol of 35° Baumé, then heated to the boiling point, and when cool was displaced. A transparent liquor of a beautiful wine colour was obtained, and evaporated in a water bath to the consistence of a thick extract, having a brown colour. This was treated with sulphuric ether of 55° Baumé, yielding all the fixed oil to it, and a large portion of the extract. The ethereal solution was of a light brown colour, and had a bitter taste, leaving when evaporated an oily and a resinous substance, like that already described. That portion of the extract not dissolved by the ether was boiled in distilled water, which dissolved a small part of it. The solution was of a dark brown colour, had a disagreeable and slightly bitter taste; the undissolved part having much the appearance of hæpatic aloes, was dissolved in alcohol of 42° Baumé, treated with pure animal charcoal, and the liquid allowed to evaporate spontaneously. In this state it had but little colour, and was in form analogous to tannin. To purify it still further it was washed in cold distilled water. It is soluble in a solution of caustic potassa and aqua ammonia, from which it may be precipitated by the addition of an acid, very soluble in alcohol, less soluble in carbonate of potassa and carbonate of soda, and insoluble in water. A solution of it in alcohol has the same bitter taste as the substance resembling hæpatic aloes. Under peculiar circumstances, the cause of which I have not yet been able to find out, it assumes a hydrated form. Eight grains of the dark brown resin left after treatment with ether and water is sufficient for a strong purge; it is a hydrogogue cathartic operating with griping, and producing a nauseating effect. Six grains of the resin still purer, operated as a *drastic* cathartic; it also occasioned vomiting and great debility. In the pure and colourless state it is amorphous. By one operation it was obtained in opaque feathery scales, by another in a light colorless powder, another in a translucent gelatinized mass, and often in globules like dried gelatin. Repeated efforts were made to crystallize it, but without success.

Four ounces of the root in coarse powder was boiled a few minutes in a mixture of alcohol and water in the proportion of one of the former and two and a half of the latter; when cold it was displaced. The liquor was of a reddish brown colour and yielded on evaporation by water bath twenty-four per cent of dry brown colored deliquescent extract, which was reduced to powder, treated with alcohol of 42° Baumé, boiled with purified animal charcoal, filtered, and allowed to evaporate spontaneously. The residue was of a very light brownish colour, had the appearance of a resin, and was redissolved in alcohol of 42° Baumé, and precipitated by water, which operation left a large portion of coloring matter in solution. The precipitate was separated, washed with distilled water, dissolved in alcohol of 42° Baumé, and left to evaporate. It was now in a very pure state, and analogous in its character to that obtained in the preceding experiment. Its alcoholic solution was bitter and caused a raw scratching sensation in the throat; it is dissolved and decomposed by nitric acid, producing a beautiful light burnt umber colour, approaching to a purple; and by sulphuric acid, to which it imparts a rich olive colour with a purple shade around undissolved portions. It is very soluble in hot diluted alcohol. Ten ounces of the dried root was treated according to the process of Mr. Wm. Hodgson, Jr., viz., by boiling it in water with lime, precipitating the clear liquid with sulphate of zinc, evaporating the filtered liquid to dryness, treating the residue with cold alcohol of 42° Baumé, and animal charcoal, and allowing it to evaporate spontaneously. The substance thus obtained was in the form of a gelatinous mass, resembling that described in the preceding operations, except that it was more soluble in hot water, apparently being converted into a hydrate by the lime treatment. Six grains of this mass was taken without any apparent effect, owing perhaps to its containing a large amount of water and impurities.

Ashes of the Root.—A portion of the root was incinerated, the product which weighed twenty-two grains was lixiviated with water, which dissolved out four and a half grains of solid matter. The liquid was reduced by evaporation, and a solution of tartaric acid was added, which caused a liberation of carbonic acid.

In a few minutes after the effervescence had ceased, a large quantity of shining crystals were precipitated, which had the characteristics of bitartrate of potassa.

Nitric acid in excess was added to a portion of the lixiviated liquid, which caused carbonic acid to be given off, and on the addition of nitrate of silver a white precipitate was thrown down of chloride of silver.

The ashes remaining after lixiviation were mixed with dilute muriatic acid and left to stand for a short time. The solution being separated by filtration, produced a precipitate with binoxalate of potassa consisting of oxalate of lime.

By the experiments detailed in this essay, it has been shown that the root contains the following principles:

Vegetable Albumen, *Gum*, *Starch*, *Gallic acid*, *Fixed Oil*, traces of *Volatile Oil*, *a Peculiar Resinous Principle*, soluble in alcohol and ether, and another soluble in alcohol only. Both possessed the active properties of the root, but the former is most active. The ashes were found to contain potassa, lime, and a chloride.

To these may be added as constituents of the root, lignin and extractive matter.

ART. LII.—ON EMPLASTRUM PLUMBI.

By N. Spencer Thomas.

(*An Inaugural Essay.*)

1st. One pint of olive oil was treated by boiling with two ounces of hydrated sesquioxide of iron, a portion of water being added as in the preparation of lead plaster; the mixture was kept at the temperature of 212° over a steady fire (fresh portions of water being added as the evaporation proceeded) for the space of three hours, at which time no change had taken place, except in colour, which was somewhat lighter than before the operation was commenced, probably from a change of oxidation, and not from any union of the oily acids with the oxide of iron.

After it had cooled sufficiently, the mixture was transferred to a bottle, and allowed to stand undisturbed for twenty-four hours, at which time the oxide of iron had entirely separated from the oil, which was as clear and transparent as before being submitted to the operation.

2d. The same quantity of olive oil as in experiment 1st, was treated in the same manner with half a pound of anhydrous sesquioxide of iron, the result being the same as in experiment 1st.

3d. One pint of olive oil was boiled with a half pound of protoxide of iron (prepared fresh, and added to the oil with the water, that it should not become peroxidized before being mixed with the oil) for the same length of time as in experiment 1st. After the water in which the protoxide of iron was added was driven off, the mixture was kept over a regular fire for a half hour, when it rose considerably above the boiling point of water; it was then removed from the fire, and water gradually added to reduce the temperature to 212°. Upon cooling, the oxide separated as in the former experiments; it being now black, it was probably in the state of a black oxide; the oil had a dark colour, caused probably by its being raised to too high a temperature, and slightly burnt. These experiments I think prove satisfactorily that the oxides of iron will not combine directly with the oily acids to form a plaster.

4th. Being in possession of an article of American litharge, which on former occasions had thrown down a precipitate of metallic lead, during the process of forming lead plaster, I determined to add a portion of red lead (oxid: plumb: rub:) with a view of supplying oxygen to the metallic lead. I therefore in this experiment took of litharge nine parts, of red oxide of lead one part; five pounds of which was added to one gallon of olive oil and two pints of water. The mixture was placed over a regular fire, and as it rose to the boiling point of water, and was continued at that degree of temperature, it gradually became darker—the yellow colour of the litharge giving way to a reddish hue. As the operation proceeded, the mass assumed a peculiar soapy appearance, the red hue gradually disappeared, until after about two hours boiling a plaster was formed, which upon being removed from the fire, and allowed to stand for a short time, became covered with a bright red froth, while the plaster below was of a dull brownish colour, and not white as when litharge alone is used. The red lead employed in this case failed to perform the desired effect, the residue or sediment of metallic lead falling to the bottom amounting to about one-fortieth of the weight of the litharge used in the process. I would add that the plaster formed with this kind of litharge is generally of a lighter colour, and more transparent when melted than that made with litharge, which produces no such precipitate; and probably this occurs, from the fact of the lead assuming a floculent form, and acting in the same way that gelatin does in clarifying liquors,—carrying down with it any particles of foreign matter that exists in the melted mass.

5th. Five pounds of English litharge in fine powder was mixed with one gallon of olive oil, two pints of water being added, as directed by the U. S. Pharmacopœia. The boiling was carried on as directed by that authority; the colour of the mass became lighter, as the operation was continued. Boiling water was added from time to time, and at the expiration of three and a quarter hours a plaster was formed of good consistence—white, with a slightly greenish tint, which is attributable to the chlorophylle, or green colouring matter in the oil. The change or variety in colour observable in experiment fourth did not occur in this experiment. Seven pints of water were necessary to the completion of the process.

6th. The same quantity of materials (the American litharge being substituted) as in experiment fifth, were mixed and treated in the manner directed for the formation of lead plaster. This parcel underwent the same change in colour, as noticed in the fourth experiment. Two and a quarter hours were required for its completion, and four and a half pints of water were consumed. The deposite of metallic lead in this instance was the same as that in the parcel where red lead was used. The plaster, however, after standing undisturbed for about five minutes, and thrown into cold water, had as fine a consistence as that made with English litharge.

7th. Eight pounds of lard being melted, five pounds of litharge (American) finely powdered was stirred into it, and a small quantity of water being added, the boiling was commenced and continued briskly, with constant stirring, until the water was driven off; then the mass attained a temperature above that of boiling water; it was removed from the fire and a fresh supply of water being added, an immediate union of the fatty acids and oxide of lead took place; a plaster being formed in a much shorter time than when the mode prescribed by the Pharmacopœia is closely adhered to. This plaster was of a good consistence, and as white, and apparently as perfectly formed as that prepared in the ordinary way. The danger of discolouring I conceive to be but little if any greater by this mode of proceeding, than by that directed by the Pharmacopœia; for the same reason that syrups may become empyreumatic by rapid boiling, the steam forming bubbles on the bottom of the vessel where the fire acts, as in this case the temperature would be about the same.

8th. A quantity of lard was boiled with an equal weight of water for fifteen minutes, then removed from the fire, and the lard allowed to harden. The lard was then subjected to the action of litharge and formed a plaster in much less time than lard that had not been treated in this way. A portion of the plaster resulting from experiment

7th was melted with resin in the proportion directed for adhesive plaster; it made a harder plaster than the result of experiment 5th, in which case olive oil was used. I account for this from the fact that the stearate is firmer than the oleate of lead. There was a slight difference in the fracture of the adhesive plaster, that made from the olive oil having a more shining fracture, than that from the lard. When applied to the skin the sticking qualities appeared the same.

The combining weight of stearine being much greater than that of olein, a less quantity of litharge would be required to convert it into a plaster, and there may be some advantage in using a plaster of this kind; as there is upon record a case of lead-cholic, as having occurred from the use of lead plaster, it might be desirable to use that which contains the smallest proportion of lead.

9th. A small quantity of officinal lead plaster was boiled with carbonate of soda, and was decomposed, forming a soap of soda, and carbonate of lead. When boiled with caustic potassa, a soap of potassa and oil was formed, and neutral margarate of lead was thrown down, which consists of one equivalent of margaric acid 140, and one equivalent oxide of lead 111.6 combined with one equivalent of water 9=260.6.

From these experiments it would appear first, that a plaster cannot be formed directly by the oxides of iron; and 2d, the specimen of American litharge used consisted of a prot and suboxide of lead, and when acted on by the oily acids it was reduced to a protoxide and metallic lead, the change of colour would indicate that oxygen is absorbed by a part, while that which parts with its oxygen is reduced; and 3dly, as the lead assumes a floculent form, and thereby improves the appearance of the plaster, it is an advantage; and 4th, it proves that lard is equal to olive-oil in all respects for making plaster, and perhaps advantageous on account of less litharge being required; and also another advantage in the preparation of it is, that less time is required for the accomplishment of the same object, than where the directions of the Pharmacopœia are strictly followed. A receipt, then, for lead-plaster that might be preferable to that of the Pharmacopœia, would be,—lard, eight pounds; litharge, four pounds; water, a pint. When the water is all evaporated, suffer the mixture to attain a temperature at which fuliginous vapours arise,—remove it from the fire and gradually add water—constantly stirring until ebullition ceases, and if the plaster be not perfectly formed, repeat the operation. When the lard was boiled with water, something was taken up, and the remaining lard acting on the litharge much quicker than ordinarily would prove Chevreuil's view to be correct. The specimen of neutral plaster obtained by boiling the officinal article with caustic potassa, appeared to be margarate of lead. On thirty grains being treated with warm diluted nitric acid, and precipitated with iodide of potassium, it yielded twenty-six grains; from which take the iodine, and twelve grains of lead would remain; to which add sufficient oxygen to make the equivalent of litharge thirteen. Take this from thirty and seventeen remains, which corresponds nearly with an equivalent of margaric acid and water.

ART. LIII.—ON A VARIETY OF CINCHONA BARK.

By William Procter, Jr.

A few weeks since a sample of bark was sent to me for examination as to its quinia strength, which presented so many of the characters of yellow bark, that at the time it was not suspected. The sample, amounting to about half a pound, consisted of several pieces from two to five lines in thickness, four to eight inches long, and more or less curved. The epidermis had in most instances been removed with here and there prominent portions of a dark, reddish-brown colour. The interior surface was of a uniform, dull, brownish yellow, the fibres straight, and the terminal spiculæ less abundant than in the calisaya. The exterior was darker coloured than the interior layers, the whole being quite bitter to the taste, and auguring well for its quality.

After a careful examination, I was not a little surprised to find nearly three per cent. of cinchonia, and no evidence of quinia, even to the most delicate tests of that alkaloid.

On mentioning this result to MM. Rosengarten and Denis, they informed me that an invoice of bark from Peru had been consigned to them, as a new article, and which in their hands had not yielded any quinine. At my request, they kindly gave me a sample of the bark, and copies of letters, etc., giving a history of its introduction here and its origin in Peru, with permission to use them.

The consignment was from a house at Valparaiso, who say: "We received from Lima, from Dr. J. Villamil, twelve seroons of bark, requesting us to consign the same to the United States, that a correct knowledge may be obtained of the quality. This gentleman has a perfect acquaintance with the article, has been the chief collector and dealer in it for many years in Bolivia; and during his present residence in Peru, discovered that, in the interior, there, a similar and equally good quality of the calisaya bark [tree] of Bolivia was growing. The only difficulty being a perfect knowledge for the selection, which he possessing has dedicated himself to it, and selected these bales as samples, although a much larger quantity has been sent by him to England.

"Should the result prove favourable, Dr. J. Villamil will extend his transactions in it, and will be willing to receive orders for purchases, which, however, we should be rather scrupulous to execute, fearful from its being a new article that it might come rather mixed in quality, as it appears that both genuine and spurious grow in the same soil and places.

"However, you will be better able to judge from the result of the seroons, regarding it; and whether you should feel inclined to send orders for it through us; without, however, our responsibility for quality.

"We further add the certificate of an essay made in Lima showing the quantity of quinine it contains."

[*Certificate.*]

"LIMA, 8th October, 1846.

DR. VILLAMIL:

Dear Sir,—The Calisaya tabla bark which you are extracting from the woods of Guanuco, in Peru, of which you have sent me a sample, in order to analyse it, I find produced two and a half per cent. of sulphate of quinine, which I assure you for the best of your interests.

I am, dear sir, yours, &c.

(Signed,) J. JEMY, Sr."

A perusal of the above letter and certificate will induce the belief that the parties believed they had sent calisaya bark, which is corroborated by the testimony of the analysis, as well as the aspect of the drug itself. The seroons are of the usual size, weighing about 160 pounds, covered with raw hide. The bark is in pieces varying from three or four to ten or fifteen inches in length, two to four lines in thickness and various breadths, generally in narrow flattened pieces occasionally in rolled or quill form, and portions broken up by attrition or packing. The exterior surface varies in different pieces to a considerable degree. A very fine specimen in my possession has the reddish-brown epidermis remaining on parts of the surface which is fissured both transversly and lengthwise, with several lichenoid spots of a whitish colour. Where the epidermis has been removed, the colour is a uniform yellowish brown, somewhat orange, marked with scar-like impressions, as if the exterior bark had been pealed off by a natural process. The interior surface has a brighter colour, is smooth and the fibres are straight, and not interlaced, as often observable in calisaya. In other pieces the external surface retains nearly the whole epidermis, which is thin and of a greyish brown hue, whilst the interior surface has a dull ochre colour, having evidently less of the red colouring matter. The fracture of all the specimens exhibits yellow translucent spiculæ analogous in appearance to those of calisaya, but less numerous, and not capable of penetrating the skin like those of the latter bark, which is one of the best criteria for distinguishing them. The edge of the bark presents the crystalline points like the calisaya, which are less numerous. All parts of the bark are decidedly bitter, accompanied at first with an acid impression, and the odour is analogous to calisaya.

Chemical Examination.—1000 grains of the bark in question taken from a number of the pieces was exhausted by water acidulated with muriatic acid, and the clear hot infusion was precipitated with a slight excess of milk of lime; the precipitate, thoroughly washed and dried, weighed

190 grs. This was exhausted with alcohol 35° Baumé by boiling, and the alcoholic liquid, which had a light yellowish colour, was evaporated until crystals commenced to form, and set aside. Twenty grains of nearly colourless crystals were thus obtained, and the mother liquor, evaporated to dryness, afforded eight grains more of the same crystals contaminated with a small amount of extractive, being 2.8 per cent. altogether. The crystals were brilliant four-sided prisons with dihedral summits; had very little taste, but after a time gave an impression of bitterness; they are insoluble in water, soluble in alcohol, especially hot, and but slightly soluble in ether. They are strongly alkaline, and cold nitric and sulphuric acids dissolve without decomposing them. The sulphate, which crystallizes with great readiness, is soluble in water, has a bitter taste, and is precipitated by tannic acid. When dissolved in chlorine water, the addition of ammonia does not cause a green colour, indicative of quinia.

The decoction of this bark is precipitated by sulphate of soda, though not so abundantly as calisaya ; it gives a dirty, greenish precipitate with persulphate of iron, a floculent white one with tincture of galls; tartar emetic instantly causes a white cloudiness, as also does oxalate of ammonia. When the filtered transparent infusion is dropped into a filtered solution of gelatin, the mixture becomes clouded, and, by standing, a very light floculent precipitate occurs.

The above results show that this bark is destitute of quinia, that it contains no aricina, and that it contains nearly three per cent. of cinchonia. The presence of this large percentage of alkali, and of kinate of lime renders all the ordinary chemical tests, as tincture of galls, sulphate of soda, etc., of little value, and in connection with the sensible characters of the bark is well calculated to deceive, as in fact nearly all of them agree with the calisaya. The character of the spiculæ noticed above, is the most striking difference, and nothing but the actual, isolation of the alkaloid will render its non-identity with calisaya certain.

It is said that a lot of the same kind of bark has been examined in New York with a similar result, and as the letter before quoted states it has been sent to England, we shall probably hear of it from abroad.

Although coming from Guanuco, this bark is not by any means to be classed with the Guanuco bark of the books, although it is analogous to the latter in containing only cinchonia. Pereira states under the head of Huanuco bark, that "Ruiz, when appointed to examine a cargo of Huanuco bark in 1799, found a bark amongst it which Tafalla has designated as "*similar to calisaya,*"—and under the name of "*light calisaya,*" Guibourt describes a variety of bark which in some of its characters is analagous to the one now noticed, but the history of the latter is sufficiently clear to render it probable that this is its first appearance in our market. The bark described at the commencement of this paper, is evidently from the same source in Péru, but was not a part of Messrs. R. & D.'s invoice.

ART. LIV.—ON THE FLUID EXTRACTS OF RHUBARB AND VALERIAN.

By William Procter, Jr.

The high and justly merited esteem in which Rhubarb is held, renders it a fit subject for pharmaceutic research. The modified character of most of the liquid preparations of this drug, as well as their feebleness, unfits them for many cases where it is applicable, and the only resource is the powder; the well known nauseousness of which renders its avoidance often desirable.

In reflecting on the subject it occurred that a preparation might be made which should be liquid, nearly as concentrated as the drug itself, and sufficiently permanent to resist the temperature of our warm season.

In carrying out this idea, it has proved successful, and a preparation afforded containing the strength of sixty grains in a teaspoonful. Several advantages will result from this degree of concentration, besides that of permanency. It may be incorporated with liquid mixtures with the greatest facility, its syrupy consistence rendering it fit for suspending calomel or blue mass, and other insoluble substances, when these are prescribed with it; by dilution with simple syrup any required strength of simple syrup of Rhubarb can be prepared extemporaneously; and admixed with the fluid extract of senna, when the two cathartics are required together, it affords an excellent mode of administration.

In the following formula there has been no addition of aromatics to mask the taste, the sugar necessary for preservation being the only adjuvant. The active part of rhubarb is ceded equally to water and diluted alcohol, but the latter has been chosen as the menstruum because it enables the process to be conducted by displacement, and requires less heat and time in the evaporation.

Another reason is that whilst this menstruum extracts all the active part, it rejects a considerable amount of mucilage, which renders the preparation less viscid. If a watery menstruum is preferred, the best mode of extracting the root is to reduce it to small fragments or shavings, free from dust; then macerate it in twice its weight of water for twenty-four hours and strongly express. The residue is again macerated in the same quantity of water, and again expressed, until three times the weight of the root is obtained.

Take of Rhubarb root,	eight ounces,	(Troy.)
White sugar,	five ounces,	"
Diluted alcohol,	two pints.	

Reduce the drug to a uniform coarse powder, by grinding, if possible, and mix it with its bulk of coarse sand; moisten it with sufficient of the diluted alcohol to form a pasty mass, and allow it to stand for an hour, or until the particles are thoroughly impregnated and swollen with the liquid. The mass is then introduced into a displacer, and shaken until settled uniformly, covered with a piece of paper or cloth, and the rest of the menstruum carefully poured on until the passing liquid has but little odour or taste of the root, which is usually accomplished by the amount of menstruum indicated in the formula, if the percolation has been slowly effected. The concentrated tincture thus obtained is evaporated in a water bath until it measures five and a half fluid ounces, the sugar added, and when dissolved the whole should measure eight fluid ounces.

Fluid extract of rhubarb, made as above, has a dark colour in mass; is transparent in thin layers; has a strong odour and taste of the drug, somewhat modified by the sugar; and a thick syrupy consistence at the ordinary temperature, and has the specific gravity of 1.30. When mixed with water the solution is slightly turbid, owing to a little resinous matter.

In reference to its permanency it may be remarked, that the preparation has been kept for a month past, during the hottest weather, in the shop, without any evidence of change in appearance or odour, and its efficacy as a cathartic in the dose of half a teaspoonful has also been satisfactorily ascertained. The formula is offered, however, that it may be tried, and under the impression that, if no unforseen difficulty presents, it will prove a valuable agent in the hands of the practitioner.

Fluid extract of Valerian.—A formula for this preparation was published in the last number of this Journal, by Evan T. Ellis, which appears to have met with favour from those who have tried it, and it is certainly the best form of exhibiting this drug yet proposed. In some recent experiments on valerian root, I have been led to doubt the entire completeness of the formula alluded to, for the following reasons.

When valerian in powder is percolated with a mixture of one part of ether and two of alcohol, in such a manner that the menstruum shall pass slowly, and cease to extract matter from the root, it requires about three times the weight of the latter. If water is now added it is with great difficulty that it passes, if the valerian has been sufficiently fine for the first menstruum. When it has passed, the infusion has a very dark colour, and but little taste.

If now the ethereo-alcoholic liquid be suffered to evaporate spontaneously till it amounts to one half the weight of the valerian used, a quantity of green oily looking globules gradually separate, which attach themselves to the sides of the vessel, or float in the liquid, which is a yellowish, strongly odorous fluid, having a decided acid reaction, and the bitter, disagreeable taste of valerian. If the globules are now separated by a filter they amount to about one fiftieth of the root used, and are in fact an oleo-resin, consisting of oil of valerian, valerianic acid and the soft resin proper to the drug. When brought in contact with litmus paper it instantly reddens it more decidedly than the liquid from which it was separated, especially if touched with a drop of alcohol. The dark aqueous infusion is now reduced to three times the bulk of the alcoholic fluid, by a careful evaporation, and mixed with the latter, which causes a turbidness which arises partially from the separation of resinous matter by the water, and partially from the precipitation of gummy matter by the alcohol.

From these facts it is evident that the whole of the active principles of the valerian are not embraced in the preparation as published.

In one hundred parts, valerian contains about twelve parts of extractive matter, and eighteen parts of gum. It is questionable whether the extractive possesses any of the properties sought for in valerian, and the gum certainly does not. By using diluted alcohol instead of water, the extractive may be removed; the gum avoided; the imperfect extraction of the volatile and resinous principles by the first liquid compensated for, and a menstruum used capable of retaining all the active principles in solution.

The increase of alcoholic strength is not sufficiently great to injure the medical properties of the preparation as the dose is small.

In view of the above results, the following modification of Ellis' formula is suggested:

Take of Valerian Root,	eight ounces, (Troy,)
Ether,	four fluid ounces,
Alcohol,	twelve fluid ounces,
Diluted alcohol,	a sufficient quantity.

Reduce the valerian to coarse *powder*, and introduce it uniformly and without pressure into a displacing funnel. Mix the ether and alcohol, and allow the mixture to percolate slowly and regularly through the powder until all has been added. The diluted alcohol is then poured on until the ethereal menstruum has been displaced, which is known by the product amounting to nearly a pint. More diluted alcohol is now poured on until ten fluid ounces of liquid passes, when the operation is stopped. The ethereal tincture is placed in a shallow vessel, and suffered to evaporate spontaneously, till reduced to six fluid ounces. The clear liquid is then poured off and mixed with the ten ounces of tincture, and the oleo-resin adhering to the sides of the dish are dissolved in a little alcohol, and added to the rest. The mixing of the liquids, by changing the strength of the menstruum, causes the separation of a little resin and oil, and a little extractive; and it is requisite that the mixture should stand, with occasional agitation, for three or four hours before being filtered, after which it should measure a pint.

When thus prepared, fluid extract of valerian is a dark brown transparent liquid, with the taste and odour of valerian strongly developed, and a decided acid reaction. One fluid ounce represents half a troy ounce of the root; which is the same proportion as in the published formula.

ART. LV.—NOTE ON THE TESTS OF THE PURITY OF BALSAM OF COPAIBA. By Mr. Redwood, Professor of Pharmacy to the Pharmaceutical Society.

Some observations which have recently been made at a meeting of this Society, with reference to the adulteration of copaiba, especially that used for filling the cheap capsules, have induced many of our members to examine their copaiba capsules with the view of determining whether or not the contents were genuine. In these examinations the ordinary tests, mentioned in works on Materia Medica, have of course been resorted to, and in some instances results have been obtained indicating, according to the tests used, that the copaiba was not genuine. I have been applied to for my opinion in two or three cases of this kind, and after examining several samples of copaiba obtained from different sources, and trying the action of all the tests upon them, I have come to the conclusion that no satisfactory method, applicable in all cases, for determining the purity or impurity of this oleo-resinous substance by the application of a simple test, has hitherto been pointed out. Some of the tests, which appear to have been most relied upon, I believe to be quite valueless, and I have no doubt that many samples of copaiba have been condemned as impure on very insufficient data.

In obtaining the results which I am about to describe, I have used the following specimens of copaiba, but some of the experiments were repeated on several others:

1. Part of a specimen in our Museum, which was received about two years ago from one of our members, Mr. Goodbarn at Rio de Janeiro. It was taken by Mr. Goodbarn himself, from a tree in a primeval forest, in the district of Macahé, about four day's journey from the city of Rio de Janeiro, on the 5th of July, 1843. The tree was at the same time cut down, and some of the wood, bark, and leaves were sent with the specimen. On comparing these with Hayne's plates, they were found to correspond with those of Copaifera trapezifolia. Mr. Goodbarn described the tree as having been one hundred feet in height, and about three and a half feet in diameter. This is probably one of the best authenticated specimens of genuine copaiba in this country.

2. A specimen of copaiba taken from some capsules, said to have been imported from France. This specimen was brought me for examination by a merchant in the city. It had been previously examined and condemned as impure, but I believe it to be genuine and very good.

3. A specimen of good commercial copaiba obtained from a wholesale house.

The following are the tests which I have applied to these specimens, together with the results:

A. The addition of two parts of absolute alcohol to one of copaiba has been recommended as a means of ascertaining whether any substance insoluble in alcohol has been mixed with the copaiba. This is one of the tests given in the *Edinburgh Pharmacopœia;* it is stated that genuine copaiba is perfectly soluble in the above quantity of alcohol.

On applying this test to the specimens, a perfect solution was formed with No. 1, but not with either of the others. After adding the alcohol, which was of specific gravity .795, to No. 2 and No. 3, a white floculent substance remained undissolved, and ultimately settled to the bottom. This substance was collected, and appeared on examination, to be the viscid resin of the copaiba, which, as met with in many specimens, is scarcely, if at all soluble, either in rectified spirit or in alcohol. I applied this test to several other samples of copaiba, which I believe to have been perfectly genuine, and obtained results similar to those afforded with Nos. 2 and 3.

The use of this test in the manner described may therefore lead to error, as it indicates the presence of impurity in cases where none exist. But this is not the only objection to this test. The evidence it affords of the presence or absence of substances which are insoluble in alcohol, is very imperfect. It is an error to conclude that a substance insoluble in alcohol, when added to that liquid alone, will therefore be insoluble if it be added when mixed with other bodies. The balsam of copaiba itself affords an illustration of this statement. This oleo-resinous substance consists principally of volatile oil and resin, which may be easily separated. The volatile oil is but sparingly soluble in alcohol, yet when mixed with the resin it is freely soluble. The same may be said of oil of turpentine and some of the fixed oils, which by themselves are either slightly, or not at all soluble in spirit, but which, nevertheless, become freely soluble when mixed with other substances, such as camphor, resin, oil of lavender, and other volatile oils. Some of the resins, also, which, alone, are but little soluble in alcohol, may be readily dissolved when mixed with camphor, volatile oils, &c. The fact of an oleo-resinous substance being freely soluble in alcohol, is therefore no proof that it contains nothing mixed with it which by itself would be insoluble, or but slightly soluble in that menstruum.

B. A solution of one part of hydrate of potassa in two parts of water has been recommended as a good test. It is stated that such a solution, mixed with nine parts of genuine copaiba, will form a transparent mixture, which will continue clear after moderate dilution with water or rectified spirit; but if there be from three to six *per cent.* of fixed oil present, the mixture will be opaque.

This test, when applied to sample No. 1, formed a mixture which continued opaque for several days; it then separated into two strata, the upper stratum being oily or saponaceous and clear, and the lower stratum aqueous, clear and colourless, and forming about one-tenth of the mixture. On shaking the tube, the mixture became again opaque; when diluted with water, it was rendered perfectly milky; the addition of spirit rendered it rather more clear, but left it still slightly opaque.

The same test, applied to specimen No. 2, formed an opaque mixture, which, after standing for some days, separated into three strata. The top stratum, constituting nearly one-half of the whole, consisted of the volatile oil of copaiba; the middle stratum appeared to consist of the resin and potash in the form of a soap; while the lowest stratum was aqueous, clear, and colourless. On shaking the tube, the mixture became again opaque, and this continued after dilution with water or spirit.

The same test, added to specimen No. 3, formed a mixture that was but very slightly opaque. No separation took place in it after standing for several days, but it still retained a slight degree of opacity. On adding a little more of the copaiba to the mixture, and shaking them together, it became perfectly clear, thus proving that the quantity of solution of potash first added was rather more than the copaiba was capable of forming a clear mixture with. After obtaining the clear mixture in this way, it became quite opaque and milky on diluting it with water, and slightly opaque on adding spirit to it.

Finding that specimen No. 3 formed a clear mixture when rather less than the quantity specified of the solution of potash was added, I treated the other specimens with the solution of potash in several different proportions. No. 2 formed a mixture very nearly transparent, when only one-third of the specified quantity of the solution of potash was used; but a separation took place on letting it stand for some hours. No. 1, when mixed in this and several other proportions, still continued opaque.

It is very evident, therefore, that no satisfactory inference can be drawn, with reference to the purity of copaiba, from the application of this test.

C. Solution of ammonia of sp. gr. .960, has been recommended as affording a good test of the purity of copaiba. It is stated, that if one part of such solution of ammonia be added to three or five parts of genuine copaiba, the mixture will be clear, presenting a similar appearance to that of the copaiba before the admixture. If the mixture be opaque, it is said to be a sign of adulteration in the copaiba.

I believe this test has been more used and relied on than any other; but Dr. Christison has objected to it, on the ground that copaiba may be mixed with a sixth of its weight of castor oil without affecting the action of the test. I have found it liable to an objection of a different character, as the following experiments will show:

Specimen No. 1, when treated with the ammonia as directed, formed an opaque mixture, which continued so after standing for several days. The ammonia was added in a great many different proportions to this specimen, but in all cases the mixture was opaque.

Specimen No. 2, treated with the ammonia, formed at first an opaque mixture; after standing for two or three days, it separated into three strata in the same manner as the mixture of the same specimen with the solution of potash.

Specimen No. 3, when treated in the same way, formed a perfectly clear and homogeneous mixture, which retained this character after standing for a considerable length of time.

This test, therefore, in addition to the objection stated by Dr. Christison, may indicate impurity where none exists.

D. Pure copaiba is said to dissolve a fourth of its weight of carbonate of magnesia, with the aid of a gentle heat, and to continue translucent, the presence of a small proportion of any fixed oil being indicated by the product being opaque. This, again, is one of the tests given in the *Edinburgh Pharmacopœia.*

This test was tried on specimen 1, 2, and 3, and the results were nearly the same in each case. After adding the magnesia, applying the heat of a water bath for about half an hour, and stirring the mixture from time to time, on allowing them to stand for a few minutes, a portion of the magnesia settled to the bottom of each of the tubes in which the mixtures were made. The fluid, or semi-fluid, portion might probably be said to be *translucent*, but I presume the test would leave as many degrees of impurity undetected as there may be degrees of translucency, for, surely, a more indefinite indication could hardly be conceived. After standing for several days, there was found at the bottom of each tube a saponaceous mass, constituting from one-third to one-half of the whole, and a clear oily fluid above. Specimen No. 3 gave the largest quantity of the saponaceous mass, and specimen No. 2 the smallest.

This test is as valueless as those previously noticed.

E. The last test to which I shall allude is probably the worst of all. It is stated, that if one part of oil of vitriol be triturated with three parts of pure copaiba, a plastic reddish mass will be formed; but if the copaiba contains castor oil it will be scarcely or not at all coloured, and will acquire the consistence of turpentine.

I need hardly say that this statement is erroneous, and the test of no manner of value.

Having thus proved the worthlessness of these methods of detecting impurity in balsam of copaiba, it becomes an important question to determine whether there is any other less exceptionable method.

The consideration of this question involves a reference to the natural history and chemical composition of the different varieties of copaiba met with in commerce. What is the substance to be tested? Is it always the same, or do different specimens of it differ in their physical and chemical characters? The answers to these questions will be found to explain the discrepancies already noticed in the action of the foregoing tests on different samples of copaiba.

The substance called balsam of copaiba, is an oleo-resinous exudation, obtained from several species of the genus Copaifera, by making incisions into the trunks of the trees. It possesses most of the chemical characters of common turpentine. By distillation, or saponification, it may be resolved into a volatile oil and a hard resin. These exist in very different proportions in different samples of copaiba, depending, probably, upon the species of Copaifera from which it has been obtained, the soil and climate in which the trees have grown, and the length of time during which the copaiba has been kept. I have found the quantity of volatile oil to be twice as great in some samples as in others, and to this difference is chiefly to be ascribed the dissimilar action of the tests upon it. There is probably no simple test that could with any satisfaction be applied for the detection of impurities in a substance which is itself subject to such great varieties in composition.

The only method that appears to me to be at all satisfactory, of examining a sample of copaiba, with the view of estimating its purity and value as a therapeutic agent, is, first, to resolve it into its proximate constituents, and then to examine these separately, with reference to their physical and chemical characters. The volatile oil is generally considered to be the principal, if not the only constituent of copaiba, which possesses any medicinal activity. This may be separated by distilling the copaiba with water, and its physical characters are so well marked, that it is difficult to conceive an adulteration that would not be readily detected. The resin would of course be at the same time separated by the above process of distillation, and the consistence and other characters of this part of the constituents of the copaiba will afford the best means of judging of the presence or absence of any non-volatile impurities.

The proportion of volatile oil, in different specimens of copaiba met with in commerce, is in some cases as low as 30, in others as high as 60 per cent. The specimens No. 1 and 2, alluded to in the foregoing experiments, contain nearly 60 per cent. of volatile oil; they are therefore unusually rich in the most active constituent of the copaiba. This volatile oil has the same ultimate composition as the oil of turpentine, with which it closely coincides in the action produced by most chemical agents; but its taste, smell, and other physical characters, afford means of distinguishing it from that or any other substance with which it is likely to be mixed.

The proportions of resin, in different specimens of copaiba, also vary to about the same extent as those of the volatile oil, the quantity being greatest where the quantity of oil is smallest, and *vice versa*. The resinous part of copaiba differs but little from common resin, obtained from turpentine. It is considered to possess but little medicinal activity, probably not more than common resin.—*Pharm. Jour.*

ART. VI.—ON EXTACT OF INDIAN HEMP. By Andrew Robertson, Esq., Professor of Chemistry to the Medical College, Calcutta. Communicated by Messrs. T. and H. Smith, of Edinburgh.

A number of pounds of the extract of hemp were prepared by me—I think upwards of thirty in all—for the purpose of having its medical properties fully tested by European medical men. A quantity went to Paris, another to Berlin, another to London, sent by different parties, and for my share of the matter I sent four pounds of it to Scotland, part of which went to you. I do not care about making more of it, as its preparation is most tedious and troublesome, in which I was tormented by the Excise regulations of the country, for both the plant and the spirits used are the subject of heavy duties and stringent precautions, and the cost price of the extract to me, counting nothing for trouble, was fully fifteen shillings per lb. Dr. O'Shaughnessy made his extract with alcohol, in a Papin's digester, at a heat above the boiling point of alcohol—the extract so obtained is brown; mine is of a deep green, and gives a grass-green tincture to alcohol, and has six times the activity of the brown, as ascertained by trial on hospital patients. If a speedy effect is desired it is given as a tincture; if a deferred and protracted, as a pill.

As the process by which it was prepared is an idea of my own, since copied by others, and which probably may be claimed by them afterwards, I may mention it to you. It is a variation of the process of percolation, alcohol in vapour being the agent. A still was charged with strong spirits, and its nose introduced into the side of a cask in which the plant was pushed.

The vapour of the alcohol, and alcohol at a boiling heat thus acted on the plant, instead of cold alcohol in the usual mode of percolation. First issued a thin tarry matter containing much resin, latterly, a brown liquor containing little resin but much extractive. At this point water was substituted for the spirit in the still, and as much as possible of the spirit retained by the plant thus expelled from it. From the bottom of the cask a pipe led to a common condensing worm. Part of the alcohol was recovered from the fluid by distillation, the rest dissipated by evaporation in Wedgewood ware on a sand-bath, not exceeding the temperature of 150° Fahr. One hundred weight of the plant was used at one operation, and about eight pounds of extract obtained. The operation was conducted so slowly as in all its stages to last a fortnight.*

The extract of hemp has been long known in the East in a most widely extended range of countries, under the names of Gunjah, Churrus, Hashish, Beng or Bang, the emerald cup of Haider, &c., and under every name renowned for its exciting and narcotic qualities. It is used by the natives here in the same way as opium is by the Chinese, and on that account is the object of fiscal regulations and duties. It is known throughout all India, Arabia, Syria, and Egypt. You will find it in the *Arabian Nights*, translated by Lane, under the name of Beng, as the narcotic used by Haroun Alraschid, and others. There cannot, therefore, be a doubt that it is a drug nearly as active as opium.

The inactivity of the drug, therefore prepared in Britain, I can attribute only to faulty preparation and overheating, or to its being made from old and decayed plants. The good plant is of a greenish brown, the heads loaded with a sticky resin; the bad is palish brown and does not adhere to the fingers. The good extract gives a grass-green tincture, the bad a brownish. My extract was made from dried plants of good quality, as it cannot be readily obtained fresh in Calcutta.

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* This plan of percolation by means of condensed vapour is the same in principle with that of C. A. Smith of Cincinnati, (see vol. 18th page 98 of this Journal) except that the latter has a condensing apparatus around the vessel containing the matter to be extracted.—W. P. jr.

Mr. Fordred stated, that it had recently come to his knowledge that some of the extract, sold in London as extract of Indian hemp, was made from the plant grown in the neighbourhood of London, and he believed it possessed but little, if any, of the narcotic properties of the Indian plant.* The extract made from the hemp (*Cannabis sativa*) grown at Mitcham, was of a green colour, and being apparently an aqueous extract contained but little resin, while that prepared from the plant grown in India contained a large proportion of resin. He thought it important, as many medical practitioners in different parts of the country were trying the efficacy of this remedy, that they should be cautioned to be particular in obtaining the extract of the *Indian* hemp.

Mr. Redwood said, that much of the extract made from the hemp plant imported from India, as well as the extract which had been imported ready made, was found to possess but little narcotic power when tried in this country; certainly they had not realized the expectations which were formed from the accounts of its action given by medical men in India. Dr. O'Shaughnessy, when last in this country, had admitted that the extract, even some that he had brought from India himself, had failed to produce the effects he anticipated, when tried in our hospitals: and he had undertaken, on his return to India, to have some extract very carefully prepared, and sent over to this country. Mr. Squire had received a quantity of this extract, and he presumed it was that alluded to in the paper just read, as having been made by Mr. Robertson.

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* This statement accounts for the remarkable variableness of the commercial extract. A few months ago I had occasion to send two ounces of extract of Indian hemp to a practising physician in Mississippi, who wrote back that half an ounce of it produced no sensible effect analogous to thetrue drug, whilst two grains of another lot, since forwarded, was sufficient for a dose! May not the first article (which is known to have come from England) have been prepared from *English hemp plant?*—W. P. Jr.

Mr. Bartlett had witnessed the effect of a very small dose of extract of Indian hemp, obtained from Mr. Squire, on one of his assistants, and the action was that of a powerful narcotic. The young man stated that he felt all the symptoms of intoxication.

Dr. Ure had been recommended the use of extract of hemp, by his son; but although he tried it for some time, he never experienced the slightest effect from it. The extract was the same as the above, having been obtained from Mr. Squire.

The Chairman thought that the present state of medical knowledge, in reference to the action of Indian hemp, was very unsatisfactory and imperfect.—*Pharm. Journ.*

ART. LVII.—QUERIES RESPECTING RHUBARB CULTIVATED IN THE NEIGHBORHOOD OF BANBURY, (ENGLAND.*)

1. How many persons cultivate rhubarb for medical use in the neighborhood of Banbury? State their names, and the number of acres occupied by each person.

2. For how many years has medical rhubarb been cultivated in that locality? What number of persons are employed in its cultivation and preparation for the market.

3. Is more than one species cultivated? If so, how many? By what names are they popularly distinguished? Specimens of all the species cultivated, either fresh or carefully dried, should be forwarded. The specimens should include *root*, *stem*, *leaves*, *flowers* and *seed*.

4. At what age and in what season is the root dug up for medicinal use? What are the uses respectively made of the root-stock and root-branches? Are both employed for yielding the medicinal rhubarb of the shops? Is the stick English rhubarb prepared from the root-branches?

5. Describe the mode of preparing the root for the market; including the cleaning, slicing, drying, and other operations. Is the root dried at ordinary temperatures in the air, or by the aid of artificial heat? If the latter, is it effected by the heat of a stove or a kiln; and at what temperature? What varieties are made of it in commerce, and what are the names by which these are known?

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* The following queries and answers respecting English rhubarb were given and received by one of the Standing Scientific Committees of the Pharmaceutical Society of Great Britain. It is probable that a similar action on the part of our College would elicit much interesting information relative to some of our indigenous drugs. The collection of Seneka, Spigelia, Serpentaria, the cultivation and manufacture of the Castor bean, and various other subjects, might be illustrated by apothecaries resident in the regions where they grow, and such information communicated for this Journal would be particularly acceptable.—W. P., Jr.

6. What uses are made of the *leaves* and *leaf-stalks?* Are the latter sold for the table? Is wine ever prepared with them? If so, a sample to be sent. Is there reason to suspect that the leaves are used for adulterating tobacco?

7. Which is the principle mart for English rhubarb root? Is it entirely consumed in England, or is any of it exported? What is the average price of it?

8. Is rhubarb cultivated in other parts of England for medicinal use? If so, where and to what extent?

ANSWERS TO QUERIES RESPECTING THE CULTIVATION OF ENGLISH RHUBARB, NEAR BANBURY.

By Mr. William Bigg.

1. Three parties cultivate rhubarb root for sale, in the neighborhood of Banbury, viz. Rufus Usher, of Overthorpe and Bodicott; Thomas Tustian, of Milcombe; and Edward Hughes, of Neithorp. The exact number of acres is not known, but probably does not exceed twelve altogether. On some portion of such land other crops are occasionally grown.

2. The cultivation of rhubarb for medicinal use was first undertaken in this neighbourhood by a surgeon and apothecary, named Hayward, about fifty years ago. That gentleman died in the year 1811. His widow (of a second marriage) is living, and states that Mr. Hayward, having communicated the results of his experiments to the Society of Arts, in London, received from them two medals—one of gold, the other of silver. The number of persons employed in the cultivation, &c., does not, probably, exceed six or eight—men, boys, and sometimes women.

3. Only one species is in cultivation for medicinal sale; *Rheum Rhaponticum.* It has no distinctive popular name. Specimens of the seed and of the prepared root are forwarded. (The stem and leaf procured are decayed.)

4. The root is suffered to grow from three to four years

in the ground, and does best in a light sandy soil.* If it were allowed (if they could afford to let it) to grow longer it would be all the finer and better. It is dug up in the month of October, or sometimes November. The root stock is what they call "*trimmed*" in large pieces (as specimens sent.) The root branches ("*fibres*") go into the market as "*cuttings.*" The third form in which it enters into commerce is that of "*raspings,*" these being the produce of the process of "trimming." The cuttings are most likely to acquire the name of the "*stick English rhubarb.*"

5. The slicing, &c., I must defer till further information can be obtained, observing that I believe there is some precaution necessary in barking or stripping the root, so as not to pull off more than the true rind.

The root is dried in "drying-houses," heated by stove pipes or brick flues. The root when prepared for the drying house, is placed on a flat piece of basket work—some three feet long by two feet wide, and that is suspended by means of strings from above, over the pipe or flue—first at a considerable elevation (similar shelves containing root in a more advanced condition intervening), and gradually nearer as the process matures. There is great care requisite in conducting the process of drying—in *graduating* it; for if the root in a recent condition were subjected to the temperature to which it should be subjected in the final stage, it would become unsaleable, and they say "black in the *inside.*" The "cuttings," "fibres," or root-branches, are pierced and strung, and so hung up in the drying-house. The trimmed are pierced only to give them uniformity of appearance with the foreign.

6. Of the leaves, I believe no use is now made, except the use common to all vegetable offal—manuring. The leaf stalks are now very partially sold for the table. In former

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* Mr. Atkins, of Northampton, who is an authority on such things in general, says that a cool rich soil suits it best.

years, the sale of the leaf stalks formed a part of the trade, but it can scarcely be said to do so now. Wine has been occasionally made of them, but not to any important extent. Curious housekeepers here and there make a little to increase the variety of the table at the village "wake." The leaves were some years ago in demand (as I have reason to think) for the adulteration of tobacco, or the manufacture of cigars, but are not at present.

7. The principal, and with a small exception, the only mart for English rhubarb root is London. It is there purchased by the wholesale druggists, who would probably state that a great part of it is subsequently exported. Some of it is sold no doubt to the Jews and Turks *as English*, but I strongly suspect that a much larger portion is sold to the Christians as *foreign*.

The "cuttings" make, I dare say, a very decent powder, mixed according to conscience with East India Rhubarb. The price is variable, and though I have often in the course of the last ten years heard it quoted, I cannot trust my memory for a figure.* The "trimmed" is of course the highest —from two-thirds more to double the price of the "cuttings."

I have heard it stated on computation that not less than about twenty tons are, in the various forms described, annually sent into the market.

8. I know of no other place in which rhubarb is grown for medical purposes in a wholesale way. A field of rhubarb when in flower—the stalks from six to ten feet in height—has a very striking appearance, and cannot be passed without observation.

The leaf-stalk grown in private gardens is not unfrequently preserved with sugar, and is recommended in that form by Dr. Kerr, of Northampton as a laxative.—*Pharm. Journ.*

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* The large pieces fetch more, in proportion to their sizes. The prepared root is rubbed over with powder, and sometimes when damp with ochre.

ART. LVIII.—ON THE PREPARATION OF LACTIC AND BUTYRIC ACIDS.

By A. Bensch.

In the preparation of lactic acid according to the process of M. Gobley, there is nothing to show when the metamorphoses of the sugar into lactic acid has been effected, as he employs so much water that the lactate of lime formed remains almost wholly in solution. But since the formation of butyric acid begins as soon as the production of lactic acid is terminated, a great loss of lactic acid may readily occur, which may be easily prevented by using a smaller quantity of water. The addition of tartaric acid to the solution of sugar, in order to convert the cane into grape-sugar, and the addition of stinking cheese, facilitates the formation of lactic acid, and prevents the contemporaneous production of large quantities of butyric acid.

The circumstance that the lime-salts prevent the separation of the otherwise so sparingly soluble salts of zinc and protoxide of iron, does not allow of the employment of the lime-salt in the preparation of the above salts; and I therefore prefer decomposing it with sulphuric acid, and combining the lactic acid with oxide of zinc, as the purification of the lactate of zinc and the separation of the lactic acid from it present no difficulties. The mixture which I use for the preparation of lactic acid is essentially the same as that employed by Pelouze and Gelis for the preparation of butyric acid.

Lactic Acid.—6 lbs. of cane-sugar and ½ oz. of tartaric acid are dissolved in 26 lbs. of boiling water, and set aside for some days; upon this, 8 oz. of old stinking cheese, well diffused in 8 lbs. of curdled acid milk from which the cream has been removed, are added to the above mixture along with 3 lbs. of finely-powdered chalk, the whole located in a warm place, so that the temperature of the liquid is from 86° to 95°. It is well stirred every day several times; in the course of 8 to 10 days the entire mass solidifies to a stiff paste of lactate of lime; 20 lbs. of boiling water and ½ oz. of caustic lime are added to this paste, boiled for half an hour, and filtered through a linen bag. The liquid is evaporated to the consistency of a syrup, set aside for four days, in which time the lactate of lime has separated in a granular crystalline form; it is expressed, then agitated with one-tenth its weight of cold water, again submitted to pressure, and this operation repeated two or three times.

The lactate of lime, after being expressed as well as possible, is dissolved in twice its weight of boiling water; and for every pound of expressed lactate of lime, 3½ oz. of sulphuric acid previously diluted with its weight of water added to the solution. The hot liquid is immediately filtered through a conical bag from the gypsum, and boiled with 1⅝ lb. of carbonate of zinc for every 1 lb. of sulphuric acid used for a quarter of an hour; if boiled longer, a very insoluble basic salt is formed. The solution, filtered boiling hot, soon deposits perfectly colourless lactate of zinc in crystalline crusts, which may be obtained perfectly free from sulphuric acid by rinsing with cold water. The mother-ley is again boiled with any of the salt which may have remained on the strainer, or concentrated by evaporation. It yields, nearly to the last drop, perfectly white zinc salt.

To separate the lactic acid from this salt, I dissolve it in 7½ parts of boiling water, pass a current of sulphuretted hydrogen into the hot liquid until it has become cold, and no further separation of sulphuret of zinc is perceptible. The liquid filtered from the sulphuret of zinc is boiled to expel the excess of sulphuretted hydrogen, and then evaporated in a water-bath to the consistence of a syrup. 8 parts of lactate of zinc yield in this manner 5 parts of perfectly pure syrup lactic acid.

Butyric Acid.—When the above mixture of sugar, chalk, &c. is left longer than ten days at 95°, and the evaporated water renewed, the mass again becomes liquid, gas bubbles are given off, and in from five to six weeks the lactic acid is converted into butyric acid, and the evolution of gas ceases. The liquid is now mixed with an equal volume of cold water, and a solution of 8 lbs. crystallized soda added; the corbonate of lime collected on a filter, and well washed; the liquid evaporated to 10 lbs., and mixed cautiously with 5½ lbs. of sulphuric acid, which has previously been diluted with an equal weight of water. Butyric acid separates as a dark-coloured oily layer upon the solution of the bisulphate of soda, and can be readily separated by a separating funnel. The solution of bisulphate of soda is submitted to distillation, the product saturated with carbonate of soda, the butyric acid likewise separated after evaporation by sulphuric acid, and the crude butyric acid rectified, after the addition of 1 oz. of sulphuric acid for every pound, in order to prevent the separation of anhydrous sulphate of soda, which would cause a violent thumping. The dilute rectified butyric acid is saturated with fused chloride of calcium, which separates the acetic acid, and then again submitted to distillation. The first portion that passes is dilute butyric acid containing traces of muriatic acid; this is succeeded by concentrated butyric acid, and there is left in the retort a small quantity of chloride of calcium and brown-coloured butyric acid.

Pelouze and Gelis distilled the crude butyrate of lime with muriatic acid; this operation requires very large retorts, as a violent frothing is unavoidable; moreover, by this method the butyric acid is rendered very impure by muriatic acid, two evils which are avoided by the method I have proposed. I obtained from 6 lbs. of cane-sugar 28 oz. of pure concentrated butyric acid.—*Ch. Gaz., from Liebig's Ann.*

ART. LIX.—ON THE PREPARATION OF INDIA-RUBBER BY VULCANIZATION AND CONVERSION.

By Mr. Brockedon.

Mr. Brockedon's object in this communication was to describe, —1st, a mode of treating India-rubber by which new properties are imparted to this substance; 2d, the new uses in the arts to which these acquired properties now render India-rubber applicable. *Vulcanization* and *conversion* denote that combination of India-rubber with sulphur from which the new properties about to be described result. The process of conversion consists in submitting India-rubber to the action of bisulphuret of carbon mixed with chloride of sulphur. The caoutchouc cannot, however, be penetrated by this process to any depth; and therefore it is inapplicable when the mass to be acted on is thick. The process of *vulcanization*, which seems to be more applicable, is the result of many experiments made by Mr. Hancock; who found that caoutchouc, when immersed in a bath of fused sulphur, heated to various temperatures, by absorbing the sulphur, assumed a carbonized appearance, and lastly acquired the consistency of horn. It was in the course of these changes that it attained the state of vulcanization which Mr. Brockedon afterwards described. The same vulcanized condition can, however, be produced either by kneading the India-rubber with sulphur and then exposing it to a temperature of 190°, or by dissolving the India-rubber in any known solvent, as turpentine, previously charged with sulphur. Having thus explained the processes, Mr. Brockedon described the effect which they produced on the caoutchouc:—1st, the India-rubber, thus treated, remains elastic at all temperatures; in its ordinary state it is quite rigid at a temperature of 40°; 2d, vulcanized caoutchout is not affected by any known solvents, as bisulphuret of carbon, naptha, or turpentine; 3d, it is not affected by heat short of the vulcanizing point; 4th, it acquires extraordinary powers of resisting compression. Thus, a cannon-ball was broken to pieces by being driven through a a mass of vulcanized caoutchouc—the caoutchouc itself exhibiting no other trace of its passage than a scarcely perceptible rent. The applications of this substance appear to be almost infinite. Our readers are familiar with the usefulness of the "elastic bands;" but they may not be aware that the same fabric, adjusted in size and strength to the purpose required, furnishes springs for locks and for the racks of window-blinds. It is also capable of being moulded into the most intricate ornaments; its charactercistic elasticity removing all embarrassments in relieving the undercut parts. It furnishes impervious bottles for volatile substances, like æther; as well as an excellent ink-stand. It is adapted to protect from corrosion, wires subjected to the action of the sea, as is the case of the wires required for the projected electric communication between England and France. For the same reason, air-tubes of vulcanized rubber are better suited for life-boats than those formerly made of canvass, which are liable to be destroyed by the action of the water. A similar tube has been used with success as a substitute for an iron band as the tire of a carriage-wheel; and it is stated that a vehicle so arranged runs much easier than on the present plan. But perhaps the most important application is in its use in railroads and railroad carriages. In the former, it is laid between the rail and the sleeper, and thus prevents the rails from indicating any traces of the pressure; and the springs connected with the buffers of the latter, when formed of vulcanized caoutchouc, can neither be broken, nor can their elasticity be surmounted by any degree of concussive violence. In conclusion, Mr. Brockedon exhibited objects illustrative of the great physical change induced on caoutchouc by vulcanization. He showed a screw, with its recipient, both made of this substance, as well as a form of letter-press (like a stereotyped page) for printing. He also noticed its usefulness in making epithems for surgical purposes, gloves and boots for gouty persons, &c.—*Chem. Gaz. from Proceedings of Royal Institution.*

ART. LX.—PHARMACY IN SPAIN.

By M. Orfila.

There are in Spain two pharmaceutical faculties, one in Madrid, the other in Barcelona; the title of Doctor in Pharmacy is, however, granted only in Madrid. For the faculty of Pharmacy, there is in Madrid a large and noble building, containing rooms for the different offices, lecture rooms, apartments for the meetings of the faculty, public *concours*, &c., as well as for the different mineralogical, zoological, chemical, and pharmacological collections. There are besides several laboratories, one of which, under the direction of Professor Camp, is especially intended for the use of the students of the pharmaceutical department during their course of studies. With regard to the botanical garden belonging to the faculty, Orfila observes, that it is not sufficiently ample, and the students of Pharmacy are consequently under the necessity of proceeding to the Royal Botanical Garden, which is however at once the pride and ornament of the metropolis.

The whole course of pharmaceutical studies occupies, like that of medicine, nine years; that is, in case the candidate aspires to the rank of Doctor in Pharmacy. The majority of students are however satisfied with the degree of Licentiate of Pharmacy, to obtain which, only seven years study are necessary. This degree ranks with that of Licentiate in Medicine, and entitles the possessor to practice Pharmacy throughout the whole kingdom; while the doctors of Pharmacy are, in addition to this, qualified for the public offices of instruction, such as *Agrégés* and Professors in Pharmacy.

At the expiration of the fifth year, every student in Pharmacy is expected to pass an examination as *Baccalaureus pharmaciæ*, which title is merely honorary, and does not allow of his practising Pharmacy independently. In order to be enrolled among the students of Pharmacy a good education is indispensable, and candidates are required to pass the *examen philosophicum*, besides devoting at least one year to the study of general chemistry, mineralogy, zoology, and botany. After these preliminary examinations, the student commences at the College during

The First Year.—Special mineralogy and zoology, with reference to Pharmacy and description of pharmaceutical preparations, three times a week, under Professor Lallana.

Second Year.—Pharmaceutical botany and Materia Medica, with special description of the plants used in Pharmacy, three times a week, under Professor Leon.

Third Year.—Chemistry of inorganic substances and pharmaceutical chemistry, three times a week, with Professor Ximenes.

Fourth Year.—Chemistry of organic substances and chemical Pharmacy, three times weekly, with Professor Rioz.

Fifth Year.—Practical instruction in all pharmaceutical operations, with Professor Camp.

Sixth and Seventh Years.—Pharmaceutical practice in a dispensing establishment.

Eighth Year.—Chemical analysis of alimentary substances, drinks, mineral waters, poisons, &c., with Professor Pow, who likewise directs the studies of the medical students in this particular branch.

Ninth Year.—Bibliography, history, and literature of medicine and pharmacy, by Professor Asuero of the faculty of medicine.

According to Orfila, the professors of pharmacy, like those of medicine, lecture without notes, and distinguish themselves by a profound knowledge of their profession. With regard to the course of pharmaceutical studies, he remarks that greater attention seems to be bestowed upon the theoretical than the practical education, and that the materia medica, practical pharmacy, and toxicology, appear somewhat neglected when compared with other branches. There is in this respect a striking contrast between the system of pharmaceutical education in Spain, and in this country. In Spain, too little attention is paid to practical pharmacy, while, in Great Britain, the theoretical education of pharmaceutists is (so far as the legislature is concerned) entirely neglected. The preliminary liberal edudation, strictly enforced in Spain before the students of pharmacy can be enrolled before the faculty, is, we think, highly creditable to the Spanish profession, and is, to a certain extent, worthy of imitation in this country. The entire course of study at the Spanish institution (nine years) is prolonged to an unnecessary extent. Supposing the preliminary examination to be passed at the age of sixteen or seventeen, a course of pharmaceutical studies extended over four or five years, including the time occupied in the shop, would be, in our opinion, quite sufficient to enable the student to qualify himself for a good practical examination in pharmacy. Orfila seems to think that a period of eight years ought to be allowed for the qualification, and that the student should begin with the theoretical portion, and occupy the sixth and seventh years in the dispensary, to obtain a knowledge of the practical part of his profession. In Buchner's *Reperterium für die Pharmacie* quite a contrary view is taken, and the German system of commencing with the practical part is defended. The writer in the *Repertorium* thinks that the student of pharmacy, after five years studies at the university, will scarcely be induced to accommodate himself to the dry and often disagreeable duties of the shop. We consider that the two departments of the pharmaceutical education ought to be continued together. The neglect of either the theoretical or practical portion, must of necessity detract from the efficiency of the pharmaceutical Chemist.

All students should attend a regular course of lectures, as well as of practical chemistry in proper laboratories, at the same time keeping in view the necessity of unremitted attention to the ordinary duties of the profession from which they are to derive a subsistence.

At the expiration of each year the student in Madrid is examined by two professors and one *agrégé*, as to his progress during the year. At the licentiate examination at the end of the seventh year the candidate is examined *orally*, in *writing*, and also practically in *chemical analysis*. The examination is quite as severe as that for the corresponding degree of licentiate in medicine. The examination for the degree of Doctor in Pharmacy is passed by comparatively few persons, the ordeal being very severe, and the vacancies at the faculty occurring at rare intervals. The pharmaceutical faculty in Madrid consists of the above-mentioned six professors and three *agrégés*, or assistant professors. Of the latter, one acts as secretary to the faculty, another as librarian, and the third as director to the laboratory. In 1842, the number of students of pharmacy registered by the faculty was 650, in 1843 it had increased to 780.

The fees are as follows:

Registration for first year	55	Francs.
Total for the five following years	275	“
Degree of Bachelor of Pharmacy	125	“
——— Licentiate	750	“
Total	1205	“
(Or rather more than £48 sterling.)		
The degree of Doctor of Pharmacy, *rarely taken*	750	“
	1955	“
(Or about £78 sterling.)		

The above abstract of the papers on medicine and pharmacy in Spain, by Orfila, has reference to the state of these sciences subsequently to the reform of 1835. Prior to that period the medical institutions of the kingdom were submitted to a board of medicine, appointed by the minister or by the crown, and subject to all the inconveniences attending a close connection between science and power. The distinction between physicians and surgeons was rigidly observed, and government situations given to the most subservient. The physicians in Spain seemed inclined to be more liberal than their opponents the surgeons, and with few exceptions joined the constitutional party of 1820. Upon the overthrow of this party in 1823, King Ferdinand revenged himself upon the liberal physicians by a decree converting surgeons into physicians, surgical colleges into medico-chirurgical, and granting the title of *medico-cirujanos* to a great number of young surgeons and students. No physician was permitted to enjoy any medical post at court, or in any of the public establishments, hospitals, &c. This state of affairs lasted quietly until the death of this medical reformer, when a contest arose between the physicians and medical colleges or surgeons appointed by Ferdinand. At length, by a royal decree of Christina, a medical commission of five members was appointed to consider the state of medicine in the kingdom and to draw up a plan for the necessary reform. The result of their deliberations has been briefly given in this paper and may propably be interesting to the medical reformers of our own country.

Preamble to the Royal Decree, appointing a Commission of Five Persons with a Secretary, to consider and report upon the modifications necessary for the Medical Reform in Spain.

"Animated by pure zeal for the preservation of the Public Health, and convinced of the necessity of rendering uniform the studies which are the basis of the healing art in all the Colleges and Universities now existing, or which hereafter may be founded in the kingdom; persuaded also of the advantage of duly honouring those who dedicate themselves to a profession as noble as it is necessary; I have thought well to institute a Commission, which may examine and propose to me such changes as the laws now in force may be susceptible of, and of whatever else, in the opinion of the Commission may contribute to the lustre of the Profession and the welfare of the Public."—*(Bulletin de Medecina, Cirugia, y Farmacia, Madrid,* 1835, *from Gaz. Med. de Paris and Jour. de Pharm.) Pharm. Jour.*

ART. LXI.– EXPERIMENTS ON THE DETECTION AND QUANTITATIVE DETERMINATION OF STEARINE AND STEARIC ACID IN WAX.

By E. Geith.

Carbonate of soda affords a ready method of detecting the adulteration of wax by stearic acid. When pure white or yellow wax is boiled in a porcelain dish with an equal weight of carbonate of soda and 6 parts of water, constantly stirring until a layer of carbonate of soda begins to form at the bottom of the dish, a tolerable quantity of the wax itself is saponified. If the mass, while still hot, is treated with 6 times the weight of the wax of alcohol of 0.80 spec. grav. and the whole then rubbed to a powder, with a gradual addition of from 16 to 18 parts of alcohol of 0.50 spec. grav., until the insoluble portion remains suspended in the liquid, a considerable precipitate is produced in the filtered solution by an acid. When, therefore, wax is tested with carbonate of soda for stearic acid, this substance saponifiable by soda must be previously extracted, which may be done with alcohol. In examining wax, it should first be tested for stearic acid; about 2 drms. of the sample to be examined are digested for some time in a flask with 1 oz. of lime-water and 1 oz. of distilled water, when the liquid, if stearic acid be present, loses its alkaline reaction. Regnault has, it is true, asserted that a precipitate of stearate of lime is deposited from the liquid, but the author was never able to obtain any such precipitate; on the contrary, even turbid lime-water became clear on digestion with the wax. When the absence of stearic acid has been thus ascertained, 1 drm. of the sample of wax is boiled for a few minutes in a flask with 2 oz. of alcohol of 0.80 spec. grav., and the whole poured into 1 oz. of alcohol of the same strength; after a few hours the finely-divided wax is collected on a filter and washed with 2 ounces of the same alcohol. The wax on the filter is pressed between two porous tiles till nearly dry; it is then carefully transferred into a porcelain dish, and boiled with 1 drm. carbonate of soda and 6 drms. of distilled water, stirring the whole time, until some carbonate of soda begins to form on the bottom of the dish; 1 oz. of alcohol of 0.80 is added to the warm mass, and the mixture stirred gradually, adding some ounces of alcohol of 0.50, until the insoluble portion is converted into fine powder. When it has become perfectly cold, it is poured upon a filter, and edulcorated with alcohol of 0.50, until acetate of lead no longer produces any opacity; the whole is then evaporated to 1 oz. The residue is filtered when cold, and washed with weak spirit. The liquid which passes is well shaken in a phial with 2 to 4 per cent. of stearic acid or stearine, a considerable froth is formed, which persists from half an hour to an hour; with pure wax the frothing is very slight, and it soon disappears. To further test the liquid, an excess of acetic acid is added to it; if the wax was pure, there is at the utmost only a faint opalescence; but if it contain stearine or stearic acid, a precipitate is formed, especially on shaking. If it is desired to determine the amount of these impurities, the liquid is not treated with acetic acid, but with acetate of lead, as long as a precipitate is formed, and the liquid then acidified with acetic acid. When the precipitate has subsided, it is collected on a weighed filter, and washed with distilled water until the liquid which passes through is no longer coloured by sulphuretted hydrogen. If the wax was pure, the quantity of the precipitate from 1 drm. only amounts from one-half to two-thirds of a grain; if it contained 10 per cent. stearine, it amounts to 2 to 2½ grs. The quantity of the precipitate is not constant, and it is far more easy to determine the stearic acid than the stearine, for with 5 per cent. of the former the precipitate amounts from 2 to 2⅔ grs. M. Buchner states, in a note to the above paper, that he has convinced himself of the practicability of the above method.—*Chem. Gaz., from Buch. Rep.*

ART. LXII.—ON ARTIFICIAL BLUE COPPER, (COPPER-INDIGO.)

By A. and C. WALTER.

THE monosulphuret of copper, hitherto artificially obtained either by precipitating persalts of copper with sulphuretted hydrogen or by treating the sesquisulphuret of copper with cold concentrated nitric acid, is generally not blue like copper-indigo, but dark-green or brownish-black; if, however, the precipitate obtained with sulphuretted hydrogen is dried at a moderate temperature, it frequently yields a greyish-black powder, which under a steel polisher, gives a faint steel-blue streak, especially when it is fixed by means of size upon paper, and after drying burnished with the polishing steel. According to the observations of Covelli respecting the formation of blue copper at Vesuvius, it appears as if it were produced by the long-continued action of sulphur upon persalts of copper; and the authors therefore attempted to prepare it in a similar manner. After numerous experiments, they found the following process to be the most advantageous :—Pure sulphate of copper is dissolved in hot water, dilute solution of caustic potash or soda added to it until nothing further is precipitated; the precipitate is then washed in hot water, and dried at a high temperature, until the entire mass has become converted into black oxide. 1 part of this oxide is now heated in an open dish with 1 part sulphur and ½ part chloride of ammonium until the sulphur takes fire; while the sulphur burns, the mixture is well stirred, covered from time to time with a loose lid, removed from the fire for a time, and a fresh quantity of 1 part sulphur and ½ part chloride of ammonium added, the dish covered and again exposed to a gentle heat. When the dish has been left covered for some time, it is removed from the fire and allowed to cool and the lid taken off, when, if the right time has been hit, a portion of the sulphur will be found sublimed, and this should then be furthered by gentle heat. If the mass does not possess a dark blue, but still a black colour, it must be mixed with more sulphur and chloride of ammonium, and heated as above, constantly taking care, however, that the temperature is not too high; it is on that account advisable to add from time to time fresh portions of powdered chloride of ammonium. The indigo-blue or dark-black powder thus obtained is now finely ground, and washed with a sufficient quantity of water to remove all chloride of ammonium; to get rid entirely of the sulphur, the well-washed powder is boiled with a strong solution of potash or soda until no more sulphur is removed. It is frequently requisite to wash the compound, which has been well exhausted with boiling ley, and to treat it with fresh ley. The mixture might also contain undecomposed oxide of copper, which could be removed by digestion with caustic ammonia, but not without occasioning some loss of sulphuret of copper. However, when the operation is well conducted, especially with repeated additions of sulphur and chloride of ammonium, no such impurity will easily occur. The residuous mass is now well-washed with water, to remove all adherent potash and soda. The sulphuret of copper so obtained forms an indigo-blue or blackish blue dull powder, which when burnished with a polishing steel assumes a beautiful steel-blue tint. Ground up with oil or varnish, it affords a beautiful violet-blue. It can be prepared equally well from metallic copper, or by mixing the dry monosulphuret of copper with sulphur and chloride of ammonium, and treating it as above directed. Carbonate of copper would answer equally well, as also the nitrate, but not the chloride.

The compound described exhibits the same behaviour as the monosulphuret obtained by precipitating persalts of copper with sulphuretted hydrogen; but it is not dissolved so easily by cyanide of potassium or sulphuret of ammonium; but it dissolves readily in ammonia when air is allowed access, forming ammoniacal oxide of copper and depositing sulphur. The authors have not yet made any analysis of this compound, but it is very probable that its composition is identical with that of blue copper. It is more difficult to answer the question whether it has the same composition as the bluish sulphur compound prepared by Winkelblech. The samples made by the authors, according to the method described by Winkelblech, did not possess the beautiful blue colour of the compound described.—*Ib.*

ART. LXIII.—ON CITRATE OF MAGNESIA, AND A PURGATIVE WATER MADE WITH THIS SALT.

By M. Roge Delabarre.

On making some experiments with the salts of magnesia, I had occasion to observe that the citrate of magnesia is devoid of the bitter and disagreeable taste which characterize the other soluble salts of this base.

This result, which at first surprised me, appeared less extraordinary on considering that of all the soluble salts of iron, the citrate is almost the only one which is free from the particular taste that distinguishes the ferruginous salts.

Experiments founded on these observations, led to the conclusion that these facts, so far from being exceptions, may be taken as illustrations of a law which may be thus generalized:—That, *of all the salts of any base, the citrate* *is that in which the taste peculiar to the base is to the greatest extent lost.*

Citric acid, which appears to have the property of thus modifying the taste produced by the base with which it may be combined, is obtained in several states. It contains sometimes three, sometimes four, and sometimes five atoms of water.

According to Liebig, the formula for citric acid, such as it is met with in combination with oxide of silver, is $C_{12}\,H_5\,O_{11}=\overline{Ci}$.

Crystallized citric acid, dried at 212°, contains $C_{12}\,H_5\,O_{11}+3\,H\,O=\overline{Ci}+3\,H\,O$.

If it be crystallized from a boiling solution, it will contain $C_{12}\,H_5\,O_{11}+4\,H\,O$; and if crystallized by spontaneous evaporation at 68° Fahr., its composition will $C_{12}\,H_5\,O_{11}+3\,H\,O+2\,H\,O=Ci+5\,H\,O$.

Citric acid is a tribasic acid, it forms with bases neutral salts, acid salts, and basic salts.

In the neutral salts, each atom of acid is combined with three atoms of base. These salts are represented by the following formula: $\overline{Ci}, 3\,M\,O+Aq$. Their composition, is, therefore, analogous to that of the acid, with four atoms of water. The water of hydration in these salts may be replaced by an atom of metallic oxide, when basic salts are formed. These have an atom of water of crystallization, which they lose at common temperatures, as the salt of silver, or at a higher temperature. They are therefore analogous to the acid with five atoms of water. The composition of the basic salts when dried, is $\overline{Ci}, 3\,M\,O+M\,O$.

The citrate of magnesia, which forms the subject of this notice, is a salt but little known, being scarcely mentioned by chemists. Liebig, in his *Traité de Chimie Organique*, merely says, "Magnesia, alumina, and protoxide of manganese, form, with citric acid, neutral insoluble salts, and soluble salts which are acid."

Berzelius, in the eighth and ninth volumes of his *Traité de Chimie,* which treat of the salts of magnesia, mention the oxalate, the acetate, and the tartrate, but not the citrate. In his theory of chemical proportions he gives the following composition for the citrate:—Magnesia, 26.12; citric acids 73.88; but no account is here taken of the water of crystallization, which the salt contains.

Citrate of magnesia may be obtained in two different ways. It may be made by double decomposition from sulphate of magnesia and citrate of soda, or by saturating a solution of citric acid with magnesia or the basic carbonate. If it be prepared by saturating a solution, somewhat concentrated, of the acid, the liquor which is at first liquid and transparent, becomes in an instant a hard mass, adhering strongly to the sides of the vessel in which the combination is effected. This arises, probably, from the water which at first holds the salt in solution, passing to the state of water of hydration.

The neutral citrate of magnesia, prepared by either of the processes above described, is a white pulverulent insipid salt, soft to the touch, heavier than magnesia, and soluble in water aided by the addition of a slight excess of the acid. This solution has a slightly acid taste, but is in no way disagreeable.

A small quantity of the citrate of magnesia having been put into a glass tube and heated over the flame of a lamp, aqueous vapour was disengaged and condensed at the other end of the tube. On further heating the tube, white inflammable vapours were given off, in which carbonic oxide and acetic acid were distinguished.

One gramme of citrate of magnesia, dried *in vacuo,* and then strongly calcined in a porcelain capsule, left a white residue, consisting of pure magnesia, and the weight of which was 0.170.

Citrate of magnesia may, therefore, be considered as having the following composition:

1 eq. Citric acid, . .	2511.25	55.3
3 eq. Magnesia, . .	774.00	17.2
1 eq. Water of Constitution,	112.50	2.5
10 eq. Water of Crystallization,	1125.00	25.0
	4522.75	100.0

There is the same quantity of oxygen in the water present as in the acid.

I propose the following preparation for the administration of citrate of magnesia:

SEIDLITZ WATER FREE FROM BITTERNESS.*

Or, Purgative Mineral Water of Citrate of Magnesia.

No. 1 (mild.)

	grammes.		grains.
Citrate of Magnesia, . .	40	=	617.360
Citric Acid, ...	2	=	30.868
Simple Syrup, . . .	125	=	1929.252
Essence of Orange, . .	q.s.		
Water charged with Carbonic Acid,	q.s.		

to fill a common mineral water bottle, containing 750 grammes (about the size of a wine bottle.)

No. 2 (strong.)

	grammes.		grains.
Citrate of Magnesia, . .	50	=	771.701
Citric Acid, ...	2½	=	38.585
Simple Syrup, . . .	150	=	2315.103
Essence of Orange, . .	q.s.		
Carbonic Acid Water, . .	q.s.		

for a wine bottle.

The following is the formula for making 100 bottles of the above, each containing 50 grammes, or 771 grains of the citrate:

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* The common *seidlitz water*, as made on the continent, contains sulphate of magnesia.

Dissolve 6 pounds 9 ounces and 364 grains (avoirdupois weight) of crystallized citric acid in 22 pounds of water, and add to the solution 1 pound 5 ounces and 83 grains (avoird.) of calcined magnesia. When the combination has been effected, filter the solution, and add to it 33 pounds (avoird.) of simple syrup flavoured with essence of orange. Distribute this solution in one hundred wine quart bottles.

Then—

Precipitate 2 pounds 10 ounces and 145 grains (avoird.) of sulphate of magnesia, with a sufficient quantity of carbonate of soda, in the usual way; wash the precipitate, put it into a proper apparatus, with about 90 pints of water, and pass carbonic acid through it until the magnesia is dissolved. This being effected, use the solution thus formed to fill up bottles into which the previous solution has been put.

Report by Messrs. Renauldin and Soubeiran on the above Mineral Water.

The proportion of magnesia in the citrate is sensibly the same as that in an equal weight of the crystallized sulphate, but the former salt is not so powerful in its medicinal effects as the latter, the fifty grammes or 771 grains of citrate contained in the bottle of mineral water, being about equal in effect to thirty or thirty-five grammes (463 or 540 grains) of crystallized sulphate.

Notwithstanding the large quantity of citrate in the mixture, the taste does not at all indicate the presence of any salt; it resembles lemonade in flavour, and acts as a purgative, quite as well as the ordinary seidlitz water. It certainly affords, from its agreeable taste, a good method of overcoming the repugnance of some patients to purgative medicines. It occasions neither thirst nor tenesmus, and but little pain during its operation, it may therefore be said that it operates safely and agreeably. Our observations would indicate that the proper dose of the salt is forty-five grammes (694 grains) for a man, and forty grammes (617 grains) for a woman.

In the preparation of the magnesia lemonade according to the above formula, the first part of the operation consists in making a citrate of magnesia with excess of acid. In the second part of the process, part of the free citric acid is saturated with the carbonate of magnesia, carbonic acid being at the same time set free so as to make it an effervescent water, while there is sufficient uncombined citric acid to give it an acidulous taste.—*Pharm. Journ., from Journ. de Pharm.*

ART. LXIV.—ANTIDOTE TO PRUSSIC ACID.

BY MESSRS. T. AND H. SMITH.

SOME time since, an antidote to the poison of prussic acid was made known to the public by us, through the medium of the *Lancet*, of 5th October last. Subsequently, Professor Christison, Mr. Taylor, and other eminent toxicologists, have sanctioned with their approval the principle of the proposed antidote, which, when tried on animals, proved so strikingly successful. It need only be repeated here, that the utility of the remedy rests on the presentation to the deadly acid of iron in such a state of oxidation, as to form with it the well-known compound called Prussian blue; and as the latter is innocuous to the stomach, animal life may be preserved wherever such a combination of the acid with the iron can be timely formed. In suggesting this process, we claim only the merit of having noticed the necessity for presenting the iron in a double state of oxidation—of protoxide and peroxide—along with an alkaline carbonate, and of having made known a method for using the same as a remedy, safely, practically, and effectually.

As cases of poisoning by prussic acid are becoming, unfortunately, more and more numerous, it has occurred to to us that a simpler, though certainly inferior mode of using the remedy proposed by us, might have a chance of being more frequently available. By the first method the antidote would require to be prepared and kept in readiness, by practical chemists and medical men. The plan which we are about to propose renders this less urgently necessary. The materials for the antidote are among the most common articles of every laboratory or drug shop.

The English medical practitioner, who lately fell a victim to prussic acid, and who lived *twenty minutes* after being seen by his brother and partner in business, would in all human probability have recovered, had the following remedy been known and used—since the parties were in their own house, and had a laboratory close at hand. The materials required to form the antidote, are sulphate of protoxide of iron or green vitriol, tincture of the muriate of iron, and carbonate of potash, or the ordinary salt of tartar of the shops. The principle is the same as that first stated—the presentation, namely, of the protoxide and peroxide of iron to the prussic acid, in the presence of an alkaline carbonate, so as to cause its neutralization, but in a different way. We will now endeavour to explain how and in what proportions the different substances, composing the antidote are to be used, so as to secure the end aimed at.

As according to Phillips' observations as well as our own, one fluid ounce of the tincure of the muriate of iron contains about thirty grains of peroxide of iron, one drachm must contain very little less than four grains; and as the prussian blue resulting from the action of the antidote is composed of two equivalents of sesquicyanuret of iron, and three equivalents of protocyanuret,

$$3\ \mathrm{Fe\,Cy} + 2\ \mathrm{Fe_2\,Cy_3},$$

two equivalents of the sesqui or peroxide $80 \times 2 = 160$ with the proper quantity of a protosalt of iron, will separate nine equivalents, or 226.51 of prussic acid:

thus H Cy 1 equivalent$=27.39 \times 9 = 246.51$.

Taking as the basis of our calculation the quantity of peroxide of iron contained in tincture of muriate of iron, it will be found by the rule of proportion, that one drachm of the tincture, containing four grains will neutralize 5.6 grains of real or anhydrous prussic acid, or 280 grains of the strength prescribed by the London College, thus

$$160 : 246.51 :: 4 : x = 5.6.$$

The relative quantity of sulphate of the protoxide of iron, or green vitriol, can also be learned by proportion, for as two equivalents of peroxide of iron are united to three equivalents of protocyanuret of iron, to constitute Prussian blue,, every two equivalents of a peroxide of iron in solution must be mixed with three equivalents of a protoxide of iron also in solution; and as the equivalent of protosulphate of iron is 130, three equivalents will be 390, calculating from these figures, it will be found that four grains of peroxide of iron will require 9.75 grains of green vitriol, for

$$160 : 390 :: 4 : x = 9.75.$$

In the same way the correct quantity of salt of tartar, or carbonate of potash, may be found. The equivalent of this is, in round numbers, 70, of which nine equivalents must be present, along with the prussic acid to seize the nine equivalents of the strong acids, sulphuric and muriatic, contained in the mixed iron salts, to allow the prussic acid to take their place. The affinity of prussic acid for iron, is not of itself sufficient to effect this result, but the two affinities—that of prussic acid for iron, and sulphuric and muriatic acids for the alkali—acting in concert, do so at once. Nine equivalents being $70 \times 9 = 630$, four grains of peroxide of iron will require 15.7 grains carbonate of potash, thus

$$160 : 630 :: 4 : x = 15.7.$$

According to the above calculation, one drachm of tincture of muriate of iron and 9.75 grains of green vitriol in solution, on being added to a liquid, containing 15.7 grains of carbonate of potash, can separate prussic acid from that liquid if present, whether in an open vessel or in the living stomach, to the extent of 5.6 grains; but in fact, it will be found that an amount equal to that is not separated. This is readily understood, when it is recollected that the common carbonate of potash is a very deliquescent salt, and further, that it is by no means pure; and besides this, the tincture of muriate of iron contains an excess of acid, which, with the alkaline carbonate will form chloride of potassium, which has no affinity for the prussic acid, but must have the effect to the extent of the quantity formed, of diminishing the amount of carbonate really effective in precipitating prussic acid. The practical result of these various disturbing causes, is, that on precipitating the prussic acid by the method above explained, from a liquid containing the acid in considerable excess, the Prussian blue, separated by filtration and converted into peroxide of iron, weighed, after ignition, instead of seven grains, only one-third of that number. So that instead of 5.6 grains of anhydrous prussic acid being removed, the real quantity was only a third of this; but it must be kept in mind, that if a quantity of acid exceeding that should be taken, it is but too probable that the unhappy individual would perish too quickly to allow of any means whatever being used. To make up to a certain extent for the moisture and impurities of the salt of tartar, instead of using 15.7 grains, which is the correct quantity when in a pure state, twenty grains should be used. We would not recommend more than this, as an excess of alkali would so far prevent or redissolve the precipitate, causing the production of prussiate of potash; which, although it has been found to have no poisonous action on the human body, yet it seems better that the poison should be separated in an insoluble form.

To render our meaning more precise and clear, and less likely to be misunderstood, we will briefly state the course which we think ought to be adopted. On the one hand, dissolve ten grains of sulphate of protoxide of iron, or green vitriol, in an ounce of water, using a mortar to hasten solution, and adding one drachm of the tincture of muriate of iron. Put this liquid into a phial, and in another phial dissolve twenty grains of carbonate of potash, or, according to its common name, salt of tartar, in another ounce or two of water, and to prevent delay—the serious consequences of which cannot be two strongly impressed on the mind, as every moment bears a swift message of life or death to a human being—dispense with labelling, and let the person who prepares the antidote, if possible, go at once and give it himself.

The action of the antidote forms of itself a very pretty and interesting experiment, which may be shown in the following way:—Dissolve in one glass, containing a little water, eight grains of carbonate of potash, adding twenty or thirty drops of medicinal prussic acid, and in another glass, five grains of green vitriol in half an ounce of water, adding half a drachm of tincture of muriate of iron. Mix the two liquids together. As there is too small a quantity of prussic acid present to convert the whole of the iron into Prussian blue, the colour of this is masked by oxide of iron thrown down at the same time; but on adding a sufficient quantity of a strong acid, such as nitric acid, to dissolve the oxide of iron, as Prussian blue is not soluble in the acid, it remains displaying its strikingly beautiful and characteristic blue colour.*—*Pharm. Journ.*

ART. LXV.—ON THE VARIETIES AND CLARIFICATION OF HONEY.

By Otto Köhnke.

1. *Varieties.*—It is well known that raw honey varies in its properties according to the nature of the vegetation from which the bees have gathered their food; according as the honey is obtained from cultivated or wild bees; according to the method and attention used in separating it from the wax, as well as according to the age of the honey and the manner of preserving it.

The honey of young bees is in general lighter coloured and more agreeable than that of old bees, even when both kinds of bees gather their honey in the same district, except when the honey is gathered from the flowers of the buckwheat, the common heath, and coniferous plants, in which case the honey of old bees may also be white. But young

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[* The above should have found a place in our pages long since. Messrs. Larocque and Lepage have each examined the power of the proposed antidote, and agree that whilst it is no protection against the anhydrous poison, nor even certain when it is diluted with eight times its weight of water,—yet for the more dilute preparations, as that of our Pharmacopœia cherry laurel water, etc., it is very serviceable, and to be relied on if given in time.—Ed. Am. Jour. Pharm.]

bees always yield, under like circumstances, whitish honey, whether the same be separated from the wax without heat, or at a temperature of from 88°.25 F. to 99° F., and by pressure. It is also well known that honey becomes brown or impure if too great heat and too strong pressure be applied. Brown honey has a less specific weight, and does not become so quickly granular as white honey.

Bright yellow honey of young bees, whose food consisted chiefly of buckwheat blossoms, solidified, after three or four weeks, into a crumbly unctuous mass, and had a specific weight of from 1.425 to 1.429. *Honey of old bees* from the same place concreted only after four and six weeks and formed a crumbly unctuous mass, having a specific gravity of from 1.415 to 1.422.

Honey of a heath country (heath-honey) was of a pale yellow colour, harder than the before-mentioned, and had a specific weight of 1.425 to 1.434. From old bees of the same heath-country the honey was light brown, and had a specific weight of 1.422 to 1.430.

Honey of a marshy country (marsh-honey), where the bees had gathered their food chiefly from the flowers of the Brassica, Vicia Faba, and Trifolium, was almost white, hardened after six or eight days into a mass which could be compared to melted ox-tallow, and had a specific weight of from 1.435 to 1.440, and was consequently the heaviest of the whole and possessed the best qualities. Marsh honey, therefore, is in much request.

2. *Preservation.*—The preservation of honey is best effected in small wooden tubs with well closed lids, so that such a vessel when once opened may be emptied in three or four months. The honey after having run, and been pressed out of the comb at a temperature of from 88°.25 F. to 90° F. should be immediately poured in these vessels which should be put in a dry cool spot. When the honey has concreted, it should be covered with waxed paper, and and the vessels closed with well fitted lids. Earthen pots

are sometimes burst by the solidification of the honey, and they are, therefore, less suitable for the preservation of honey than small wooden casks. In damp air the honey gradually undergoes a partial decomposition: liquefying and becoming sour. If the acid of such old honey be saturated with milk of lime, some ammonia is evolved and lactate of lime formed. That the honey ferments, if it be watery, is well known. If the same after being diluted with water be saturated with lime a flocculent sediment is formed, which possesses the qualities of a ferment containing caseine.

It has been hitherto believed that all honey contains some free acid; but Köhnke tested recently separated and almost colourless marsh-honey, from more than fifty hives, with litmus paper, and could not discover any acid reaction. But upon testing honey from bees which had been killed by brimstone, an acid reaction took place.

3. *Clarification.*—As regards the purification of honey for medicinal use, there has been already so much written and proposed on it, that one would scarcely believe that anything new could be added; nevertheless we think that the following deserves notice. Köhnke prefers the method of purification by means of charcoal (*kohle*) to all other methods. In order, therefore, to prepare ***Mel depuratum***, he takes ten parts by weight of solid honey, five parts by weight of water, and one part of animal charcoal (bone black), in pieces of the size of peas, and carefully separated from the fine powder. The whole is heated in a covered tinned copper kettle over a slow charcoal fire, at a temperature of 144°.5 F. to 167° F.

This heat is to be kept up for from twenty-four to thirty-six hours; frequently stirring the mixture. At last the heat is to be increased until the honey begins to boil, which must be only allowed to continue for one or two minutes. He then pours the whole into an earthen vessel, and lets it stand for six or eight days.

Should too much water have evaporated, and the specific weight be found heavier than 1.300, sufficient water must be immediately added after the ebullition. If the specific weight be lower than this, the raw honey must have been watery and light. In that case proportionately less water should be employed from the beginning.

In six or eight days the charcoal has settled to the bottom of the vessel, so that the now almost clear honey only requires to be poured upon a thick single or double woollen cloth, taking care not to disturb the sediment. From forty to fifty pounds of pure clear strained honey of 1.300 specific weight are obtained in a few hours. If brown honey was used, it appears after purification of a wine-yellow colour. White honey requires only half of the above-mentioned quantity of charcoal, consequently for twenty pounds of honey only one pound of charcoal is required, and the *Mel depuratum* thereby obtained is nearly colourless.

By this process the honey undergoes no decomposition. It is well-known, however, that honey boiled, according to the old method, diluted with water, for a longer period in an open vessel, loses its balsamic fragrance, and in general undergoes a remarkable change. But the honey purified by Köhnke's method is deprived of all opaque and waxy particles, has a specific weight of 1.300, and retains its natural fragrance, although in a weaker degree, together with the agreeable taste of the raw honey. If one or two drachms of it be diluted with from four to six ounces of water, no flocculi are deposited. An especial proof of its strength and purity consists in its becoming again granular after it has been for some time exposed to a temperature of from 54° to 58°.5 Fah. The residual charcoal and the filter or strainer should be washed with hot water in order to extract the residual honey, which may be employed for technical or economical purposes. The loss of honey, however, is scarcely worth consideration.—*Pharm. Journ. from Buchner's Repertorium.*

ART. LXVI.—ON A SIMPLE METHOD OF PREPARING CORROSIVE SUBLIMATE.

By. Drs. A. and C. Walter.

The authors propose turning to account the property which chlorine-water possesses of converting calomel into corrosive sublimate, for the preparation of the latter. According to the method which they describe, calomel is prepared from the protonitrate of mercury and chloride of sodium, and is then placed in several separate vessels, as in the preparation of chlorate of potash, each of which must be capable of containing, without being quite filled, 8 parts of water for every 1 part of calomel placed in it. The gas is first passed through a washing trough, and then successively through all the vessels, until the whole is converted into a clear solution. The filtered solution is then evaporated and set aside to crystallize. Even with calomel, which had not been recently precipitated, the process proved perfectly successful. It would be highly advantageous if hot water could be employed instead of cold, and the vessels, with the exception of the last, heated upon a sand-bath; only 4 times the quantity of water would then be required, and a great part of the evaporation would be spared. Calomel may also be rubbed to a paste with water, and chlorine passed into it, when it also furnishes corrosive sublimate in the form of a crystalline powder.—*Chem. Gaz. from Buch. Rep.*

ART. LXVII.—ON THE PREPARATION OF PURE BARYTIC WATER AND PURE SALTS OF BARYTES.

By H. Wackenroder.

When 240 grms. of finely-ground heavy spar are intimately mixed with 60 grms. of colophony and 20 grms. of powdered charcoal, and the mixture heated to redness in a covered crucible nearly filled with it, the sulphate of baryta is readily and advantageously decomposed. The ignition may be affected in an ordinary furnace of sheet iron provided with a dome, and is continued from half to three-quarters of an hour. When meal or sugar is employed for the reduction, and a very strong heat, ap-approaching nearly to white heat, employed, soluble monosulphuret of barium is scarcely formed. The ignited mass is loose, yellowish-grey or reddish, and yields, on boiling with water in a porcelain dish, a saturated solution of baryta and bisulphuret of barium, together with some hyposulphite of baryta. The alkaline liquid is consequently yellowish, and deposits on suitable concentration a tolerable quantity of hydrate of baryta and some sulphuret of barium; the residue, insoluble in hot water, consists of undecomposed heavy spar with some coal, metallic sulphurets and the earthy substances mixed with the mineral and the coal. To prepare any salt of baryta, the sulphuret of barium is repeatedly exhausted with boiling rain-water, and the baryta precipitated by carbonate of soda. With very dilute nitric acid the solution readily yields perfectly pure nitrate of baryta, as this salt may be easily separated by crystallization from the less-easily crystallizing salts. Chemically-pure chloride of barium is most readily obtained. For this purpose, the solution is mixed with dilute crude muriatic acid until the liquid indicates the presence of a slight excess of acid; the precipitate of sulphur, sulphate of baryta, and at times also sulphuret of arsenic, is separated by filtration, and the liquid evaporated until but little mother-ley is left, which contains chloride of calcium, chloride of strontium and perchloride of iron. The dried chloride of barium is readily freed from adhering muriatic acid and perchloride of iron by exposing to a faint red heat, dissolving in water and filtering. About one-third the amount of the heavy spar employed is obtained; if the whole of the heavy spar had been reduced, a much larger quantity of chloride of barium would naturally be obtained, but the loss of heavy spar, which however may be employed in subsequent operations, is fully compensated for by the lesser amount of labour required.

To obtain perfectly pure barytic water, the sulphuret of barium is exhausted with as little boiling water as possible, and the yellow liquid allowed to cool in a tall covered glass. Upon this the liquid is separated as perfectly as possible from the crystallized hydrate of baryta; the latter then dissolved in water, and boiled in a porcelain dish with pure hydrated oxide of copper until a sample of the liquid yields with solution of acetate of lead a white precipitate. If, after boiling the liquid for some time, it is found to contain some copper, it is filtered, and a small quantity of hydrated oxide of silver, or carbonate recently precipitated from the nitrate of silver by pure caustic or carbonate of soda, added to it. On digestion, every trace of hyposulphurous acid and oxide of copper is removed, and sulphuret of silver formed.—*Chem. Gaz. from Archiv. der Pharm.*

MISCELLANY.

Phosphorus Paste for the destruction of Rats and Mice. By M. **Simon**, of Berlin.—The Prussian government issued an ordonnance on the 27th of April, 1843, directing the following composition to be substituted for arsenic, for destroying rats and mice; enjoining the authorities of the different provinces to communicate, at the expiration of a year, the results of the trials made with it, with the view of framing a law on this subject.

The following is the formula for this paste, as published in the *Berliner Medicinische Zeitung:*

Take of phosphorus 8 parts, liquify it in 180 parts of lukewarm water, pour the whole into a mortar, and add immediately 180 parts of rye meal; when cold, mix in 180 parts of butter melted, and 125 parts of sugar.

If the phosphorus is in a finely divided state, the ingredients may be all mixed at once, without melting them.

This mixture will retain its efficacy for many years, for the phosphorus is preserved by the butter, and only becomes oxydized on the surface.

Rats and mice eat this mixture with avidity; after which they swell out, and soon die.

M. Simon, has employed this mixture for many years, with constant success, by placing it in places frequented by those animals. According to him, the phosphorus is less dangerous than arsenic, for supposing the mixture to be badly made, and the phosphorus imperfectly divided, the oxydation which would take place in a few days would render it nearly inactive; and it would be almost impossible to employ it for the intentional poisoning of human beings.—*Pharm. Jour. from Jour. de Chim. Med.*

Fizeau's process of etching Daguerreotype Plates and its application to objects of Natural History. By **Mr. Goadby**.—In a Daguerreotype portrait, the black parts of the plate consist of silver, the white of mercury, and the intermediate tint of a mixture of the two, the degree of darkness or light depending upon the excess either of the silver or of the mercury. In converting a Daguerreotype into an engraved plate, it is necessary to etch away the dark parts and to leave the white untouched. This is done by immersing the plate in a fluid, consisting of dilute nitric acid, nitrous acid, chloride of sodium, and nitrate of potash. The nitric acid is so far diluted, that no decomposition can take place until the mixture is heated, when the chloride of sodium and nitrate of potash are decomposed, and chlorine and nitrous acid are evolved. These attack and remove the silver, or the *dark* portions of the plate, but have no effect upon the mercury, so that the *lights* of the picture, being the mercurialized portions of the plate, constitute the *etching* ground, and effectually defend such portions of the Daguerreotype from the influence of the corroding fluid. After a time, those portions of the plate that have been acted upon by the chlorine, &c., become covered with a protecting coat of the chloride of silver: this must be removed by dilute liquid ammonia, when the biting may be continued by a fresh supply of the mixed acid. Grease and foreign matter must be removed by repeated washings in dilute acid and alkali, and by boiling in caustic potash. These cleansing operations must be repeated after every biting, after washing out the chloride of silver by the ammonia. The plate being thus bitten, but in a slight degree, is to be inked after the ordinary manner of engravers, and allowed to dry; the surface of the plate is then to be thoroughly polished, the ink still remaining in the corroded portions of the plate. It is now to be gilded by the electrotype, those parts alone receiving the gold that have been previously polished. The ink is then to be dissolved out of the hollows by potash: the parts that are gilded now constitute the etching ground, instead of the mercury, and the biting may be henceforth continued by nitric acid, in the customary usage of engravers. The plate thus etched, generally requires to be finished by the hand of the engraver, who has the advantage of a *perfect*, although *faint* picture to work upon. The amount of labour which he must bestow will depend upon the goodness of the Daguerreotype, and the success of the etching. M. Claudet has fully established the successful application of this process to the purposes of illustrating Natural History, by copying from Nature and engraving several delicate and difficult dissections of the lower animals, particularly the nervous system of Aplysia and Tritonia (the latter much magnified,) and the nutrimental organs *in situ* of a caterpillar. These preparations, together with the engravings of them, were handed round.

Dr. Carpenter stated, that a similar process had been employed for engraving microscopic objects, the discovery of which was due to Capt. Ibbetson. He exhibited some plates of blood-globules, and other microscopic objects, published by Dr. Donne, of Paris, which had been procured in this way.—*Ibid.*, *Meeting of the British Assoc.*

Saponine and Ganteine for cleaning Kid Gloves.—M. Duvignau has taken out a patent for a preparation intended for cleaning gloves, and called saponine, which, according to the patent is made as follows:—

Take of Soap in Powder	250 parts.
Chloruret of Potash (Eau de javelle)	165 "
Solution of Ammonia	10 "
Water	155 "

Make the whole into a paste, a small portion of which is to be rubbed over the glove with a small piece of flannel, until it is sufficiently cleaned.

M. Buhan has prepared and sold a compound which he calls ganteine, which consists of soap and essence of citron, made into a paste with water.—*Pharm. Jour.*

On the Action of Nitric Acid upon Brucine. By A. Laurent.—It had been stated by Gerhardt, that nitrous æther was formed in the action of nitric acid upon brucine, when this, as is well known, is coloured red, an assertion which Liebig declared to be unfounded. Laurent, who repeated Gerhardt's experiment, arrived at the same result, but obtained moreover a new substance, which he calls *cacotheline*, the composition of which is represented by the formula $C^{10}H^{22}N^{4}O^{10}$. This substance yields, on treatment with ammonia, various products, one of which is a powerful base.—*Chem. Gaz. from Comp. Ren.*

Preparation of Aurocyanide of Potassium for Electro-Gilding. By Alex. Kemp.—Dissolve 1 part of gold in nitrohydrochloric acid, and render the solution as neutral as possible by evaporation to dryness; redissolve the chloride of gold in 8 parts of water, and heat the solution until it boils; add as much calcined magnesia as is equal to half the weight of the gold, and boil the whole till the liquid loses its yellow colour; the precipitate which forms is oxide of gold, with the excess of magnesia. Throw it on a filter, and wash it with boiling water until the liquid passes through tasteless. Having dissolved 8 parts of Liebig's cyanide of potassium in 80 of boiling water, pour it on the filter while still hot, it will dissolve the oxide of gold, leaving the magnesia unchanged. The same method may be followed in forming the silver solution, substituting nitric acid for the mixture of nitric and hydrochloric acids used in forming the gold solution.—*Ibid.*

On Thialdine and Selenaldine, two new artificial organic bases. By MM. Wohler and Liebig.—On passing hydrosulphuric acid into an aqueous solution of aldehyde of ammonia containing a few drops of free ammonia, the authors produced a beautiful new base, free from oxygen, and containing a large proportion of sulphur. This body, to which they give the name of thialdine, is obtained in large crystals, insoluble in water, but soluble in alcohol, and much more so in ether. It forms crystallized and well-defined salts with the acids.

The analysis of these bodies gave the following results:—

Thialdine	$C^{12} H^{13} N S^{4}$
The hydrochlorate	$C^{12} H^{13} N S^{4}, H Cl,$
The nitrate	$C^{12} H^{13} N S^{4} \; N O^{5}, H O.$

The following equation expresses the mode of formation of thialdine:—

$$\underbrace{3\,(N H^{4} O, C^{4} H^{3} O)}_{\text{Aldehydite of ammonia.}} + 6\,H S = \underbrace{C^{12} H^{13} N S^{4}}_{\text{Thialdine.}} + 6\,H O + \underbrace{2\,N H^{4} S.}_{\text{Sulphide of ammonia.}}$$

On substituting hydroselenic for hydro-sulphuric acid, the corresponding selenium compound, selenaldine, is obtained, which, though it greatly resembles the former base, is far more liable to decomposition.—*Chemist.*

Chloride of Soda as a test for the presence of Guaiacum in resin of Jalap. By M. SMEDT.—It has long been known that chlorine possesses the property of rendering resin of guaiacum blue. According to the author, the chlorides of soda and of lime also possess this property, and may be used for detecting the smallest traces of guaiacum resin when mixed with resin of jalap. In fact, two grains of a mixture of fifteen parts of resin of jalap, and one part of guaiacum resin, dissolved in fʒj. of spirit, specific gravity .825, gives on the addition of a single drop of solution of hypochlorite of soda (chloride of soda,) a green streak, which is deposited as a precipitate to the bottom of the glass, leaving the supernatant liquor of its original colour.

The sensibility of this reaction is such, that the presence of one part of guaiacum resin in 320 parts of resin of jalap may be indicated.

M. F. Boudet has found that this test may be applied with equal advantage for detecting the presence of guaiacum resin in scammony.—*Pharm. Jour. from Jour. de Pharm.*

New Green Ink. By M. WINCKLER.—Dissolve 180 grains of bichromate of potash in f℥j of water; add to the solution, while warm, f℥ss of spirit of wine, then decompose the mixture with strong sulphuric acid until it assumes a brown colour. Evaporate the liquor to one half, let it cool, dilute it with f℥ij of distilled water and filter it, then add f℥ss of spirit of wine, add a few drops of strong sulphuric acid, and let it stand. After some time the ink assumes a beautiful green colour, and is rendered fit for use by the addition of a small quantity of gum arabic.—*Ibid, from Jour. de Chim.*

Simple and easy process for quickly preparing the Iodide of Potassium. By M. J. H. PYPERS.—The process of M. Pypers consists in slightly heating a mixture of 100 grains of iodine, 2 drachms of water, 75 grains of carbonate of potassa, with 30 grains of iron filings.

The mass is dried to redness. The resulting red powder is treated with water; then filter and evaporate to dryness.

100 parts of iodine will furnish 135 parts of very white iodine of potassium, but slightly alkaline.—*Chemist from Jour. de Chim.*

Note on the preparation of Scammony and its employment. By M. WIMMER.—The author recommends the following formula, as offering the greatest advantages:

℞ Pure scammony resin	3 grammes.
Venice soap	25 centigrammes.
White sugar	275 "

Mix, and reduce to fine powder. Then add by degrees—

Powdered biscuit	24 grammes.
Water	a few drops.

Triturate well, and carefully, to remove the powder that may be attached to the pestle, and then mix with the remainder of the powder.

These powders are afterwards dried in the air, and divided into packets of 30 grammes each.

3 grammes of the powder contains 30 centigrammes of scammony.

The dose is from 50 centigrammes, which is sufficient to produce several stools in the case of an adult. For children of 15 years of age, the dose is reduced to 30 centigrammes, for those of seven or eight years to 20 centigrammes, and finally for children of two years of age to 10 centigrammes.

These powders, in addition to their purgative properties, have the advantage of being an easily administered vermifuge.—*Ibid.*

On the Preparation of Hyposulphite of Soda. By E. F. ANTHON.—If dry sulphurous acid be conducted over powdered sulphuret of sodium (in a dry state) no action is observed; but if the sulphuret has previously been moistened with about 20 per cent. of water, the sulphurous acid is then very quickly absorbed, provided the sulphuret contain an excess of carbon (*kohle.*) and was exposed only to such a temperature that it could not melt, and but only slightly concrete. During the absorption of the sulphurous acid a strong developement of heat takes place; and the pulverulent sulphuret of sodium becomes moist. These phenomena can be easily noticed if the sulphuret be placed in a glass tube, and the sulphurous acid be allowed to enter from beneath. At this stage no odour can be perceived at the upper opening of the tube, but as soon as the heating and moistening of the sulphuret have arrived at the upper end of the tube, sulphuretted hydrogen gas begins to be developed, and sulphur to sublime on the sides of the tube. If the experiment be now interrupted, hyposulphite of soda, containing carbon and some sulphuret of sodium, is found in the tube. This forms with water a pale yellow-coloured solution; but if the sulphurous acid be allowed to pass as long as the sulphuretted hydrogen is detected, and until nothing but the excess of sulphurous acid is perceived, the product gives, when mixed with water, a colourless solution, which is free from sulphuret of sodium, and, therefore, quickly changes, on the admission of air, into sulphite and sulphate of soda.

The sulphuret of sodium gains about 70 per cent. in weight (the water included.) The whole experiment lasts, when small quantities of sulphuret are used, scarcely a quarter of an hour, and from the carbonaceous crude mass, crystallized hyposulphite of soda can be easily obtained.

The facility with which solid hydrous sulphuret of sodium (hydrosulphuret of soda) is converted, by means of sulphurous acid, into hyposulphite of soda, affords, therefore, a simple and cheap means of procuring this salt, which has latterly acquired some importance for Daguerreotyping and in the manufacture of paper.

With regard to this process, it is particularly to be observed, that the transmission of the sulphurous acid into the powdered sulphuret of sodium must be stopped before the developement of sulphuretted hydrogen gas has ceased, in order to obtain hyposulphite of soda, containing some sulphuret of sodium, and consequently permanent in the air.—*Pharm. Jour. from Buch. Reper.*

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ART. LII.—ON THE CHLORIDE OF ZINC.

By Edward Parrish.

Attention having recently been directed to the chloride of zinc, as a disinfecting agent especially suited to the purposes of the practical anatomist, I was called upon to supply a solution suitable for preserving subjects in the dissecting room. This chloride, prepared according to the United States Pharmacopœia, though a beautiful article, is necessarily an expensive one, and is liable to other objections in view of the use proposed. In attempting its solution, a white precipitate is generally separated, which is insoluble except by the addition of an acid; this consists of an oxychloride occasioned by the high heat used in fusing it. The chloride is also liable to the objection of being exceedingly deliquescent, and therefore difficult to preserve in the solid form, unless completely protected from the air, and from the same cause and its corrosive properties is very troublesome to those who have occasion to manipulate with it.

To obviate these difficulties, a solution was formed directly from the zinc and hydro-chloric acid, which, while it possesses sufficient purity for the purpose, has the advantage ot cheapness and convenience of preparation.

The following is the formula I have used in preparing the solution:

Take of granulated zinc 1 pound (av.)
" Hydro-chloric acid, 4 pounds, or a sufficient quantity.
" Water, 2 gallons and 2 pints.

Add successive portions of the acid to the zinc in a glass or porcelain dish, until it is dissolved, taking care that the acid is not in excess, then strain through a coarse linen cloth, and add the water.

This solution contains about 1 part of the chloride in 12, which is believed to be the maximum strength required. It is a transparent, colourless liquid, of the sp. gr. 1.090. It has been found to diminish and generally to arrest decomposition even in very offensive subjects, and to destroy, to a great extent, the effluvia so generally proceeding from them. When it is desirable to keep a concentrated solution for the preparation of the above extemporaneously, the addition of the water, as prescribed in the formula, may be dispensed with, the first product being retained. This is a transparent liquid, of a light straw colour, having the sp. gravity of 1.579. It is highly charged with the caustic properties of the chloride, and would be suited to many purposes of the physician, though owing to the impurities existing in commercial zinc and acid, it should not be used as an internal remedy without the proper precautions to insure its purity. The addition of a gallon of water to every pint of this solution, will make a liquid corresponding to that recommended for anatomical purposes.

ART. LIII.—ON A NEW PROCESS FOR THE PREPARATION OF VALERIANATE OF ZINC. Suggested by M. BRUN-BUISSON, and perfected by M. J. LEFORT of GANNAT.

SINCE the great number of observations that have been directed to the best manner of preparing valerianic acid with a view to medicine, much light has been thrown upon the subject, and it has been satisfactorily shown that this acid is a result of the oxidation of the volatile oil.

M. Gerhardt was the first to observe that the volatile oil of valerian, when exposed to the air, gave valerianic acid. Taking advantage of this hint, M. Brun-Buisson ascertained that when the distilled water of valerian was exposed to the air for a month it yielded a much larger product of the zinc salt than when saturated immediately after distillation, and that a kilogramme (about 2¼ lbs.) of valerian would yield sufficient acid for 15 grammes (3¾ drachms) of valerianate of zinc.

M. Lefort observes* that he had on several occasions repeated the suggestion of M. Brun-Buisson, and obtained similar results, and it occurred to him that a more rapid mode of oxidizing the volatile oil might be resorted to than exposure to the air, which was satisfactorily proven by the result of the following process:

Take of	Valerian root (as recent as possible)	100	pts. or oz.
"	Water, - - - - -	500	"
"	Sulphuric acid, - - -	10	"
"	Bichromate of potassa, - -	6	"

The valerian in coarse powder was macerated for twenty-four hours in the water to which had been previously added the bichromate and sulphuric acid, in the boiler of the alembic, when the distillation was commenced. The first fourth of the distillate was returned to the still, as it contained considerable volatile oil—after which the process was continued until the distilled water ceased to redden litmus paper.

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* Jour. de Pharm. et de Chimie, tome X., p. 194.

The product of the distillation is then placed in a porcelain dish, or better, in a large matrass, and an excess of hydrated carbonate of zinc (which is ascertained to be free from iron) is added. The mixture is allowed to digest at a temperature of 190 degrees, Fahr., during two or three hours on a sand bath, until saturated. The liquor is then filtered and evaporated over a naked fire till reduced to 50 parts (oz.), when it is placed on plates and the evaporation allowed to proceed gradually to dryness in a drying room, or by any other means at a moderate temperature.

By this process M. Lefort obtained at three different operations, 17, 18, and 18½ parts of valerianate of zinc from 1000 parts of valerian root, a much larger yield than any process before tried has afforded.

It is desirable, in operating on valerian root, that it should be as freshly dried as possible, because the acid and oil are sensibly diminished in quantity by age. It is probable, however, that the relative amount of valerianic acid is greater in old than in the recent root, owing to the action of the air on the oil.

I have never been able to obtain more than 35 grains of valerianate of zinc from a pound of the root by the ordinary method of saturating the distilled water, whilst this process yields 126 grains, nearly four times as much. This difference is no doubt due in part to M. Lefort's valerian being fresher, but chiefly to his new method of manipulating.

There is a distilled water of valerian officinal in the French Codex, which is made by distilling one part of valerian with six parts of water, until four parts are obtained. This water, by standing, becomes more medicinal and permanent, and there is little doubt that it contains the chief virties of the root, and merits the attention of our practitioners. It is easily prepared, and by M. Lefort's method twice as strong as by simple distillation—and would present the drug in a form very eligible for prescription, and vastly better and more uniform than the infusion. It would probably form an admirable combination with syrup of wild cherry bark, or as a menstruum for that bark, in certain dyspeptic cases accompanied by nervous excitement and irregular action of the heart.

W. P. Jr.

ART. LIV.—PROCEEDINGS OF THE NEW YORK COLLEGE OF PHARMACY.

At a stated meeting of the Board of Trustees of the College of Pharmacy of the city of New York, held September 3d, 1846, John Milhau, first Vice President, addressed the Board as follows:

Gentlemen,—I would be doing injustice to my feelings were I not to beg your indulgence for a few remarks commemorative of the valuable services rendered to this College by our late venerated President, whom it has always been our delight to associate with in promoting its best interests.

In his death every one of us has to deplore the loss of a friend ever ready to impart most cheerfully the useful knowledge which diligent study and well matured experience had secured to a mind of superior cast.

His loss to us is irretrievable, and will be felt most deeply not only by his immediate friends, but likewise by the profession and the community at large.

The scrupulous care bestowed by him in the selection of pure articles for the dispensing department of his business enabled him but too often to detect most culpable adulterations of drugs and chemicals. Many are the instances in which sophisticated articles have been returned to the owners with such remarks from our late worthy President as would teach them he was too competent and vigilant a sentinel ever to allow their nefarious speculations to succeed in this great drug mart.

His zeal and industry in the advancement of all that could possibly benefit the science of Pharmacy, would have done credit to one much younger, but above all his example in the prosecution of his professional duties should be held up as worthy of imitation: ever conscious of the importance of personal attendance to the faithful discharge of the tedious and but ill-requited and little-honoured duties of a practical Pharmaceutist, he allowed himself no respite.

In the long course of my life I have no where known an individual who united in a more eminent degree all the qualifications requisite to form an apothecary; he was honest, virtuous, intelligent and indefatigably industrious; he inspired confidence in all who approached him. The poor as well as the rich were equally grateful to him; the first, because they were the objects of the kindest benevolence; and the latter, that the gentleman, the scholar, and the skilful manipulator should condescend to attend to the minutiæ of so delicate, and at the same time so tedious a calling.

He has left a numerous and interesting family to mourn his loss. One of his sons has already done himself credit as a distinguished graduate of this institution, and promises to sustain the fair name he has inherited.

It will now be requisite, gentlemen, that we should all unite in our endeavours to diminish, as much as possible the immense loss we have sustained in the demise of so good, so virtuous, and so useful a man as the late Constantine Adamson.

Mr. George D. Coggeshall then made some appropriate remarks on the character of the deceased, after which he offered the following resolutions, which were unanimously adopted:

Resolved, That in the death of our late President, Constantine Adamson, a great public calamity has been sustained, which has fallen with especial weight upon this College, and that we, so lately his associates, have been stricken with deep sorrow at his removal, as by the loss of one of our first members, eleven years our President, always conspicuous for his faithfulness, devoted zeal and efficiency, and yet more because of the profound respect we entertained for his counsel, the admiration, and warm personal regard in which we held his high integrity and his estimable social qualities.

Resolved, That his loss, great as it is to us, must be to his family a much deeper and more painful affliction; that we offer our sympathy, not merely in form and compliance with custom, but as sincere mourners with them, under a blow which, from their privilege of closer connexion, it is their greater affliction to feel.

Resolved, That a committee of three be appointed to collect materials for, and prepare a memorial of his life and services, to be read before the College at its stated meeting in November.

Resolved, That a copy of these resolutions, duly signed by the officers of the meeting, be presented by the committee above mentioned, to the family of Mr. Adamson.

It was, on motion,

Resolved, That a copy of the chairman's address be also presented to the family.

MEMOIR OF CONSTANTINE ADAMSON,

Late President of the College of Pharmacy, of the city of New York.

Read before a meeting of the College, November 24th, 1846.

CONSTANTINE ADAMSON, the son of Cuthbert Adamson, was born at New-Castle-upon-Tyne, England, September 11th, 1784. He went into the army at the age of 17 or 18; and in consequence of hard service in Flanders, he contracted a severe inflammation of the lungs, which induced him to procure a furlough and return home. His father being a captain in the navy, he went to sea with him, where his health became again established.

On his return from sea, he took a situation in a Drug store at Hull. To this business he appears to have been attached, and here he served his apprenticeship. Wishing to better his condition, or perhaps having a desire to travel, he came to Pictou, Nova Scotia, in the spring of 1810. He returned to England for a short time, and again to Nova Scotia. He soon after appears to have resumed the military profession, as we find that he was a major in the provincial army during the war from 1812 to 1815. About the same time he entered into the lumber trade, and made large shipments of this article to England, but in consequence of a great falling off in the price of lumber, on the return of peace, he lost the capital he had brought with him and embarked in that business. Having married in the mean time, and finding himself with a family growing up around him, and his means greatly reduced, he was under the necessity of giving up an elegant style of living and favourite sports, and turn his attention seriously to providing a livelihood for himself and family. With this view he came to the city of New York in April 1817, and commenced teaching; but was soon after attacked with inflammatory rheumatism, which lasted several months and made it necessary for him to give up his school. He was attended by Dr. Richard Seaman, of the firm of "Walters & Seaman," during his illness. About this time Walters & Seaman failed in business, and Mr. Adamson, on his recovery, was induced to take charge of the store, which was at the corner of Chatham and Doyer streets. The business was resuscitated by the assistance of Dr. Walters' friends, and Mr. Adamson continued with him.

On the death of Dr. Walters, which occurred soon after, a druggist of extensive business in this city offered to set Mr. Adamson up in business, and to furnish the requisite stock of goods and funds for that purpose. This generous offer, however, Mr. Adamson declined, alleging that he thought himself under obligations to Dr. Walters, who had befriended him, and he therefore resolved to continue the business for the benefit of his widow and children.

In the spring of 1829 the business was removed to No. 6 Bowery, remaining under the charge of Mr. Adamson, and was managed by him with great economy and success for several years, until the amount advanced by Dr. Walters' friends had been repaid them from the proceeds of the store, and a fund accumulated for the benefit of his family. Mr. Adamson then purchased the store from Dr. Walters' friends, and went into partnership with Dr. William J. Olliff, under the firm of "Adamson & Olliff." A few years since they opened a branch store at the corner of Broadway and Fourth street, where Mr. Adamson removed with his family, and where he resided until his death.

His store became the resort of physicians of his vicinity, who, with great reason, placed entire reliance on the quality of his materials, and the skill, ability, and exactness of their preparation. His knowledge of new remedies,—the fruit of unremitting study,—and of the chemical and pharmaceutical character of their combinations, had inspired the most cautious and scientific prescribers with entire confidence. His knowledge kept pace with the progress of science, and up to the day he was removed to a sick bed, he was careful to be thoroughly furnished for his responsible and arduous profession.

Mr. Adamson appears from early life to have been diligent in acquiring information. He had a fair knowledge of Greek, Latin, and most of the modern European languages; he uniformly spent a portion of the evening in scientific studies, and inquiry into branches of knowledge interesting to him. Having a retentive memory, he amassed an extensive knowledge of science, history, and general literature. He was a good physiologist and pathologist; and was often consulted by physicians who frequented his store, on questions which they found it difficult to gain the requisite assistance from their own branch of the medical profession. To all who sought information of him, his counsel and instruction were freely given; not with the ostentatious assumption of superior attainments, but with the simplicity of a child and the kindness of a friend; stating with frankness the sources of his information, and his own opinion thereon. He was ever ready to impart most cheerfully, the knowledge which his diligent study and well matured experience had secured to a mind of superior cast. He was ever on the alert to detect fraudulent and sophisticated articles, whether manufactured at home, or imported from abroad; and by his acuteness and knowledge has repeatedly prevented drugs of this character from being vended and used in this country. Nothing appeared to escape the vigilance of his active mind,

Mr. Adamson was an alien. He remained so from his upright sense of honor. Having lived in his native country till middle life, and having received a commision as an officer in its army, taking, on that occasion, the customary oath, he was under the impression that he could not conscientiously, (although he had great respect for our laws,) forswear his allegiance to his own land.

He took an active part in the original formation of the College of Pharmacy in this city. He was elected a member of the first Board of Trustees, March 25, 1829. He was elected a Vice President, March 16, 1831, and President March 20, 1835. Since his first election as President of this College, such was the satisfaction that he gave in the fulfilment of his office, and the affection with which he was regarded by the members, that he was uniformly re-elected by a unanimous vote. On several occasions he declined, or attempted to decline a re-election, but at the earnest solicitation of the members, consented to fill the office till the day of his death. From the first institution of this College, he was remarkable for an untiring devotion to its interests. In all weathers he was one of the first at his post, at the meetings of the College, of the Board of Trustees, and of committees. On these occasions, as in his every day intercourse with his friends, he was the chief point of attraction, not only from his accurate knowledge of the business in hand, but on account of his extensive general information, and cheerful courteous manners.

On Saturday the 15th of August, he was taken with a severe inflammation of the bowels, in consequence of hernia, with which he had been long troubled. Notwithstanding the exertions of the best medical talent of our city, the inflammation progressed rapidly. Finding his end approaching, he laid himself down to his last sleep with the calmness of a philosopher, and the confidence of a conscientious and upright Christian, having the fullest reliance on the goodness and mercy of his God. He expired quietly and calmly, with his family and friends around him, on Monday the 17th of August, 1846.

In his death this community has lost one of its most useful citizens, and the College of Pharmacy one of its most able and indefatigable members. He was a kind husband and father, a highly respectable member of society, a faithful friend, and an upright man. May his example be kept in mind by those who had the happiness of knowing him, to stimulate them in the path of duty and usefulness.

Proceedings of the Board of Trustees of the New York College of Pharmacy in reference to an adulteration of Iodide of Potassium.

At a meeting of the College of Pharmacy of the city of New York, held 24th November, 1846, upon reading the minutes of the Board of Trustees, it was

Resolved, that the letter received from Messrs. Haskell & Merrick, by the Board of Trustees at the meeting of the 5th instant, respecting the article purporting to be Iodide of Potassium, with the report of the committee of inspection on the subject, be offered to the American Journal of Pharmacy for publication.

By order of the College,
John Meakim, Secretary.

To the Trustees of the College of Pharmacy of the city of New York.

Gentlemen:—We deem it our duty to lay before your body a statement of facts, which we trust will not be uninteresting, or without its good effects.

On the 22d August of the present year, we purchased of the house of Messrs. Carnes & Haskell of this city, 11¾ pounds of an article purporting to be Hydriodate of Potassa, with the label on each package of "H. S. Carnes, 14 Rue Neuve St. Nicholas à Paris." The general appearance of the article was much in its favor, being white and in handsome crystals, resembling those of the Iodide of Potassium. We were induced, however, a few weeks since, to put a portion of the above into the hands of Mr. Edward N. Kent, an analytical chemist of this city, for analysis. On trial he discovered no trace of Iodine, but that it was essentially Bromide of Potassium. To this communication we adjoin one from Mr. Kent, giving the result of his analysis. From the acknowledged high standing and integrity of the importers, Messrs. Carnes & Haskell, we feel assured that this article was sold to us in good faith, and that these gentleman will be enabled to explain the transaction to the satisfaction of all.

We remain with respect yours,
HASKELL & MERRICK.

REPORT

Of the Committee of Inspection to the Board of Trustees. Read and accepted 19*th of November*, 1846.

The Committee of Inspection to whom was referred for examination, an article purporting to be Iodide of Potassium, but which was supposed to be a sophistication, respectfully report,

That in the presence of the Professor of Chemistry, whose valuable aid is always ready upon such occasions, this committee made the following minutes of the package submitted, and the experiments upon its contents.

It was in an ounce wide-mouth vial, of French pattern and appearance, cork stopped, and labelled on green paper, "H. S. CARNES, Produits Chimiques et Pharmaceutiques, 1 oz. Hyd. Potass. 14 bis, Rue Neuve St. Nicholas à Paris," and sealed "H. S. C." (in old English letters,) "Paris," (in Roman letters under the first,) on black wax covering the top of the vial.

The article, in general appearance and shape of crystals, exactly resembles Iodide of Potassium. The taste is like that of common salt, but a little more pungent.

It is readily soluble in water, though it appears to require a much larger proportion than effects a solution of the Iodide, probably as much as three parts, but this point was not accurately ascertained. With acetate of lead it threw down a heavy white precipitate.

Sulphuric acid poured upon it in a bent tube produced a brisk effervescence, and at first an evolution of heavy reddish orange fumes, which could be poured out, and fell down in the air. The effervescence continued after the fumes had disappeared.

The solution treated with starch and sulphuric acid, presented a reddish orange colour.

From these experiments, each of which was tried in comparison with a portion of Iodide of Potassium of known purity, the suspected article was judged to be Bromide of Potassium, and to decide this, Mr. Reid proposed to examine it quantitatively by means of sulphuric acid. As this proceeding required considerable time, the matter was left in his hands. He informs the committee that the substance was treated with sulphuric acid, and converted into supersulphate of Potassa. The excess of acid was neutralized with bi-carbonate of Potassa, the amount of which was carefully noted, and the sulphate it would form deducted from the whole, the remaining sulphate indicated the equivalent of sulphate of Potassa that Bromide of Potassium would give. The conclusion is, therefore, that the substance examined is Bromide of Potassium.

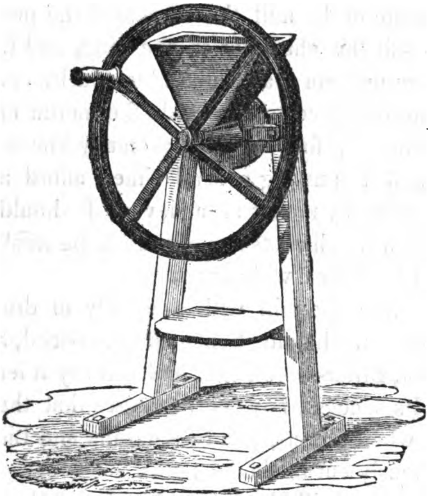
Respectfully submitted,

Signed. GEORGE D. COGGESHALL,
JOHN H. CURRIE,
WILLIAM HEGEMAN,
Committee.

New York, November 19*th*, 1846.

ART. LV.—ON AN IMPROVED DRUG MILL.

Invented by BERIAH SWIFT.



OUR attention has been recently called to an improved portable mill, designed for the use of druggists and apothecaries in grinding drugs for the purposes of decoction, infusion or displacement. " The superiority of this mill consists in the grinding surfaces of the plates being cut into circular rows of teeth, concentric with the plate, and so arranged that the teeth of one plate extend between the rows of teeth of the other plate, by which the extent of grinding surface is greatly increased beyond what it would otherwise be." The larger teeth have a claw shape, which enables them to draw in and crush much larger masses than those we have heretofore examined. The hopper is constructed of cast iron, and firmly attached in its place by a screw bolt and nut. The chief advantage of this class of mills, and this one especially, is that it will readily, with comparatively little labour, reduce dry drugs, as roots, barks, seeds, and even leaves, to a state of division fit for the action of liquids, by displacement. Senega, Ipecac, Blood-root, and other irritating substances which give much trouble in a mortar, are comminuted with ease and dispatch. As the proximity of the grinding plates can be regulated by an arrangement attached to the back plate of the mill, the fineness of the powder can be controlled to suit the character of the drug, and the particles are much more uniform than when obtained by contusion.

Though not designed to supersede the mortar and other instruments for making fine powders, yet many friable substances, by passing and re-passing several times, afford a large proportion of powder by means of a sieve. It should be understood that when tough roots or bark are to be treated, that the plates should be at first wide apart.

We have tried the mill with a variety of drugs, such as Colombo, Gentian, Rhatany, Senega, Fennel-seed, Sarsaparilla, Liquorice-root, Bitter-sweet, &c., and can say it leaves little to be desired. Its success, however, requires that the substances be *dry*, and when fibrous, like Sarsaparilla and Liquorice, that they be previously cut in short lengths.

The price of the mill places it within the reach of most druggists and apothecaries, and as "time is money," when the demand for its services is considered, it will save its cost in one year. The mill can be seen at Charles Ellis & Co.'s, who are agents for this city, or at A. B. & D. Sands, of New York, who, we are informed, are the general agents for the proprietor, Beriah Swift. W. P. Jr.

ART. LVI.—ON SOPHISTICATIONS OF SULPHATE OF QUINIA AND BLUE MASS.

By William Procter, Jr.

The boldness with which the adulteration of medicines is carried on could hardly be believed, were it not for the occasional revelations which occur from time to time, either through the vigilance of some members of our profession, or the accidental concurrence of circumstances. The following letter to my friend E. Durand, enclosing a sample of a white crystalline substance, which he believes to be salicin, was handed to me for examination.

Savannah, October 5th, 1846.

Mr. E. Durand:

Dear Sir,—I enclose you a sample of an article sold here as quinia; is it or is it not? I am under the impression it is salicin. It has been sold in considerable quantities at a reduced price, which led me to suspect it. The label is Pelletier & Delondre.

Your answer to the above will oblige

Yours, truly, Jos. M. Turner.

The substance referred to above, has the following characteristics. It is white, crystalline, inodorous, fusible by heat, and entirely combustible, has a bitter taste accompanied by the peculiar flavour of willow bark, is decomposed by sulphuric acid, which is coloured intensely red by it, is readily soluble in water and alcohol, and when distilled along with a mixture of bichromate of potassa and sulphuric acid a liquid is obtained which is turned purple by the per salts of iron, has the odour of teaberry oil, and other properties of a solution of hyduret of salicyle. Its solution is not precipitated by nitrate of baryta or tannic acid.

From these results the substance in question does not contain sulphate of quinia, but is identical with salicin, which principle it undoubtedly is, as supposed by the writer of the above letter.

That salicin should be admixed with quinine is not new, but to be entirely substituted for it, as in this instance, is a matter of surprise, as its greater solubility will at once detect it. I have been informed that large quantities of salicin have been received from Europe, which, as its use is very limited, may probably be designed for the sophistication of quinine.

Blue Mass.—A sample of blue pill mass was handed to me by Charles Ellis, with the statement that several hundred pounds of the same, as he was informed when on a recent visit to New York, had been imported from a house in England, and was now lying at the New York Custom House, ready to be imposed on the medical community. The sample presented the following characters. It had a greenish lead colour, coarse texture, without any odour of conserve of roses, and had a specific gravity of 1.777; genuine blue mass being about 2.051.

Fifty grains of it mixed with a portion of iron filings was rolled into pellets, and introduced into a glass bulb attached to a tube, which latter was bent and inserted through the cork of a bottle, and into a portion of alcohol, as recommended by M. M. Smith and Bridges, (see vol. 17 of this journal.) After the volatile products were collected in the vessel of alcohol, and the mercury well washed, it was found to weigh rather less than four grains, being about 7.75 per cent, or less than one-fourth of the true proportion.

Another portion of the mass was heated in the flame of a blow-pipe, until all the combustible matter was consumed, and was found to retain nearly its original shape. This residue had a brownish yellow colour, gritty feel when crushed under a spatula, and amounted to 24 per cent. of the blue mass burnt. It has been stated that blue slate in powder has been used in England, to adulterate this medicine, replacing the absent mercury by it. Now by adding

7.75 per cent. the quantity of mercury obtained, to 24 per cent of this incombustible residue, we have about 32 per cent. of the mass, very near the amount that should have been constituted of mercury.

The article is put up in one pound jars, of an extra large size, covered, and labelled "Blue Pill," with English arms, without any maker's name. It is said to be in charge of an individual who is agent for an establishment at New-Castle-on-Tyne, England.

Our New York friends deserve credit for their acuteness and success in detecting these foreign adulterated preparations, and it is only to be regretted in this instance that the true origin of the imposition is not known, that the authors of it might be visited by that severity of rebuke of which such nefarious practices render them deserving.

ART. LVII.—EXPERIMENTS ON SARSAPARILLA.

By W. S. W. Ruschenberger.

Some months since, with a view of comparing the value of varieties of sarsaparilla in the market, I caused the following experiments to be made by Wm. St. Clair Nichols, then the apothecary of the institution.

One pound of Para sarsaparilla was macerated in thirty-two ounces of alcohol, placed in an apparatus for displacement, and treated with dilute alcohol until thirty-two ounces were obtained. The liquid was of a clear bright colour, rather deeper than that of Madeira wine, but of the same hue. It possessed the peculiar taste of sarsaparilla. The displacement by dilute alcohol was continued, and on mixing the displaced fluids, a copious precipitate was formed, which was of a dark colour, glutinous, adhesive, insoluble in alcohol, but soluble in water. The dilute alcoholic menstruum was of a darker, richer taste, and had the peculiar taste of the root. The liquid was carefully evaporated by means of a sand bath at a temperature not exceeding 180° F., and two ounces (avoirdupois) of solid extract obtained. This extract is of a shining black colour, possessing the acridity and distinctive properties of pure sarsaparilla.

One pound of Vera Cruz sarsaparilla, treated in the same manner, yielded two and a quarter ounces (avoirdupois) of solid extract, somewhat inferior to the Para variety.

One pound of Honduras sarsaparilla, treated in a similar manner, yielded two and a half ounces (avoirdupois) of solid extract inferior in quality to that of either the other varieties.

At the time no other varieties of sarsaparilla were at hand. Recently, however, Mr. Thomas S. Wiegand, at present the apothecary of the institution, treated one pound of Rio Negro sarsaparilla, in the same manner, and obtained four ounces and twenty grains (avoirdupois) of solid extract, equal or nearly equal to that obtained from the Para varity.

The result of these trials may be stated thus:

Sarsaparilla from Rio Negro, oz. 4, 20 grains solid extract.
" " Honduras, " 2½.
" " Vera Cruz, " 2¼.
" " Para, " 2.

My own impression from these experiments is that the Para sarsaparilla is the best, the Rio Negro second, the Vera Cruz third, and the Honduras the least valuable of the four varieties. Possibly the subject may be worth further examination by those interested in the manufacture of the various preparations of sarsaparilla.

U. S. Naval Hospital, N. Y. Sept. 12th, 1846.

REVIEW.

ART. LVIII.—A MANUAL OF MATERIA MEDICA AND THERAPEUTICS, INCLUDING THE PREPARATIONS OF THE PHARMACOPŒIAS OF LONDON, EDINBURG, AND DUBLIN, WITH MANY NEW MEDICINES. By J. FORBES ROYLE, M. D., F. R. S., &c., Prof. of Mat. Med. and Therapeutics, Kings College, London, 1847.

THE author of this Manual has for some time been before the public as a laborious and thoroughly scientific cultivator of the department of Materia Medica. His "Essay on the Antiquity of Hindoo Medicine," and "Illustrations of Himalayan Botany," have given to him a high standing on the list of savans, and the present treatise, which contains much of the lore accumulated while in India, has demonstrated how well fitted he has rendered himself to illustrate the subject to which it is devoted. From the general execution of the work, its completeness with respect to Materia Medica proper, although in a condensed form, the great amount of new and most interesting matter contained in it, and the admirable arrangement; one would suppose that no apology were necessary for its appearance; yet the author has conceived that some explanation was proper. In his preface he states that it was undertaken at the request of his intelligent publisher, who may be supposed to be well acquainted with the wants of the Profession. This alone, however, would not have been sufficient to have induced the author to undertake the work, had he not also been aware, "from the complaint of pupils, and convinced from his experience as a teacher, that the student of Materia Medica required something systematic to study, which, brought up to the present time, should be sufficiently full for information, and yet as short and condensed as was compatible with the avoidance of being superficial." Another object which influenced him was in a measure to do away with the difficulties arising to students from attendance upon lectures on Materia Medica, during the first course, "before they have become acquainted with Chemistry," and while they are ignorant of Botany, and have just begun their attendance on Physiology, preparatory to a study of the nature and treatment of disease.

The work may be divided into eight parts, each of which is distinctly set forth. These are—Operations of Pharmacy, Pharmaceutical Chemistry, Mineral Materia Medica, Vegetable Materia Medica, Medicinal Plants from Ranunculaceæ to Fungi, Products of Fermentation, Animal Materia Medica, and Physiological and Therapeutical arrangement of the Materia Medica. All of these will afford material for comment, and the expression of such remarks as may be suggested by the text.

Under the head of "Operations of Pharmacy," is contained a brief summary of the operations employed, in the preparation of medicinal substances for use in the appropriate form. Such a chapter must be useful, by familiarizing the mind of the student at the outset, with the various modes of preparation, and the terms by which they are expressed. In few other works not strictly pharmaceutical are they contained. In connection with this information is presented the subject of crystallization, with the primitive forms of crystals, sufficiently extensive for beginners, and which may be advantageously followed by the study of the luminous chapter on this topic, in Pereira's large work.

The chapter on pharmaceutic chemistry is excellent, as it is a clear and distinct exposition of the information pertaining to Elements, Chemical Analysis, Synthesis, Proximate and Ultimate Principles, Combinations, the Atomic Theory, Theory of Volumes, Nomenclature, and lastly the employment of Symbols. This last is most important to students, from the universality of their use and the convenience arising from their employment. With the exception of a paper on the subject by Dr. Bridges, in a former number of this Journal, no other short, easy, and intelligible summary of all the points involved in the construction of this Berzelian language of Chemistry has appeared.

In treating of the Inorganic kingdom, the author has adopted a simple but useful arrangement. Commencing with the atmosphere, he proceeds to take up its elements, and in turn those of water; after which follow in succession the various simple products and their combinations. In this way are discussed the whole Inorganic Materia Medica. At the conclusion of each body or substance, are given its modes of application to the purposes of medicine, and the preparations, either simple or combined, resulting from pharmaceutic science. The important addition of tests, incompatibles, and adulterations, is sufficiently made, to aid in the study of this class of articles, or to assist the experimenter when reference is needed. Each article is headed by the names used in the Pharmacopœias of the three British colleges, and in passing, we may remark that the pharmacy of Great Britain still labours under the difficulties of a diverse system of pharmaceutic momenclature, which must exist until some single standard of general authority shall prevail.

The consideration of the Vegetable Materia Medica is premised by a chapter on Botany. It includes descriptive and organic Botany, classification, vegetable Physiology, and as appropriately associated with these, the chemical elements, geographical source, medical properties of families of plants, and the mode of collecting and drying vegetable substances. This portion of the work might be appropriately extended. As it is, however, an outline is presented of the divisions mentioned, which will answer the purpose of an introduction to the subject, and at the same time inculcate its importance to the pharmaceutist and physician.

We have always thought that habit, and the difficulty of obtaining ready access to books from which leading elementary knowledge could be obtained, are the causes that Medical

Botany is slighted; more especially in this country, where it is not a portion of the regular course of instruction. Certainly it is not to be attributed to any defect in the branch itself, which is both attractive and serviceable. The department of Materia Medica without it would be defective; and every treatise which pretends to scientific precision has more or less reference to it. If we take up a Dispensary, or work like the present, and turn to the account of vegetable substances, a large portion will be found devoted to the description of plants from which they are derived, in language strictly technical. To one unacquainted with the key, which is a comprehension of the botanical alphabet, or in other words the elementary principles of the branch, this portion of the very text books of Materia Medica must remain sealed, a dead letter, to be read only by the initiated; the yearning to unravel which could be easily gratified by a small degree of preliminary botanical information.

It may be thought, however, to be a mere accessory, more ornamental than useful. To this we would reply, that the physician and pharmaceutist have each, under circumstances of difficulty, to apply to the botanist to extricate him from his dilemma, as for instance in the substitution of one substance for another, adulterations, &c. Materia Medica has in a great measure been advanced to its present state by the researches of botanists, and improvement would be greatly restricted without its aid. To study it then is not only important, but essential to one thoroughly educated. The present age is one of teaching by illustration; lecturers no longer endeavour to impress the mind with incomprehensible, dry details, when by proper demonstration, information can be easily and certainly communicated, and in the study of this science, of the advantages of which we are strongly convinced, facilities in the way of improvement are becoming more numerous. A medical botany by Dr. Griffith is now in press, a work much required in the United States, and other publications are promised. In the work now under consideration, the illustrations which far exceed in excellence any in similar treatises, are not among its least merits. The arrangement adopted by Dr. Royle is a botanical one. The great reformer of botany, Linnæus, made an effort to arrange the Materia Medica upon this plan, and his essay was conclusive as to its feasibility. Similar ideas had been entertained, as for instance by Camerarius, but the knowledge was wanting for its extensive development. The natural system of Jussieu presented an admirable opportunity of engrafting upon it the most natural classification of vegetable substances, employed in medicine, and of exhibiting, that similarity of properties and virtues are so closely allied to structure and organization as to be inseparable. The eminent expounder of this system, De Candolle, has fully acomplished the task, and if not the originator of the arrangement, most undoubtedly possesses the merit of carrying it out, with so much perspicuity and convincing detail, as to have established its superiority. His "Essay on the Medical Properties of Plants," is only one of many philosophic works, equally stamped with truth and reason, emanating from his pen; and every pharmacologist should be familiar with its principles. In this system chemistry is the handmaid of botany, and advanced as the former branch has been since the year 1816, when the second edition of the essay was published, the light of experiment and research have only further confirmed his labours. This the author lived to see and to enjoy. Let us take one or two examples as illustrating the statement that has been made. The *Solaneæ* of Jussieu, or *Leuridæ*, Lin., presented a marked resemblance in botanical characters and habit, so as to lead to their being grouped in a family; the family likeness being strong, the family traits were equally striking, as they possessed deleterious properties. This was as far as De Candolle could trace the resemblance; but chemistry has exhibited that the bond is further cemented, by the discovery of an alkaloid principle in most of the articles, which discovery was foreshadowed to Vauquelin, with respect to Belladonna, when he stated that the deleterious principle of this plant is "a bitter and nauseous matter, *soluble in spirits of wine*, forming with tannin an *insoluble* combination, and furnishing ammonia from its decomposition by fire."

Another striking illustration of the position, that the advance of chemical discovery has still further confirmed the propriety and advantage of grouping vegetable substances, in accordance with a botanical arrangement, is derived from the *Rosaceæ.* This order, according to Jussieu, was an extended one. If the whole order be taken, some diversity of formation and products will be apparent; but it admits of subdivision in which exact analogy is maintained. In addition to the lines which botanical investigation has drawn around these subdivisions, chemical investigation has determined the source and principle of the activity of the individual species belonging to them to be one and the same. Thus taking ROSACEÆ as the order, we find the *Amygdaleæ* characterized, in connexion with structural resemblance, by the presence of amygdalin, which under proper circumstances yields an oil and prussic acid; the *Spiræa* containing an emetic principle, the *Dryadeæ* and *Roseæ* containing tannin, and lastly the *Pomaceæ* containing *phloridzin.*

We may find proof of the advantage and beauty of this mode of studying Materia Medica, in every order of the Jussieuan system, evincing that philosophy may be maintained even in the apparently disjointed and promiscuous materials of this department, and that nature, true to herself, alone affords the clue to its detection. To search for properties in one class which belong to another, would be just as rational as to expect "grapes from thorns or figs from thistles." But we must return from this digression to the work before us.

The primary division into plants is into two classes, *Cotyledonous* and *Acotyledonous.* The first is divided into

Dicotyledonous or Exegenous, and *Monocotyledonous* or Endogenous. The plants belonging to this class are most highly organized, and of course are most likely to attract attention. Our author has commenced with them, and in this respect differs from Pereira, who commences with vegetables the least organized and terminates with those the most complex. The four great subdivisions have been prominently introduced, and serve as a bond of further association; such are the *Thalamifloræ*, *Calycifloræ*, *Corollifloræ*, and *Monochlamydeæ* or Apetalæ.

We have already noticed the fact, that this book contains much new and interesting information respecting the plants affording, and the substances constituting, the vegetable Materia Medica. We refer as evidence of this to the articles Gambogia, Elemi, Catechu, Senna, Kino, Assafœtida, &c. The account of the latter substance is so original, that we think it important to present it to our readers, as in addition to general points of novelty, it introduces to pharmacologists a new plant.

> "Assafœtida, a produce of Persia and Affghanistan, is mentioned in the ancient Sanscrit Amera Cosha. The ancients highly esteemed a gum-resin which the Romans called *Laser*, and the Greeks οποςκυϛηναϊκὸς, or the Cyrenaic Juice, from being produced in that region. The plant διλφιον yielding it was an Umbellifer, and is represented on the coins of Cyrene. It has been discovered of late years, and named *Thapsia Silphium*. This Laser had become scarce even in the time of Pliny, who as well as Dioscorides describes another kind as obtained from Persia, India, and Armenia, which was probably the same that was known to the Hindoos. Avicenna describes *hulteet* as of two kinds: one, of good odour, from Chiruana (Cyrene?), and the other fœtid, the present *Assafœtida*. The term *assa* is no doubt of oriental origin, since it is applied to other gum-resins. Thus Benzoin is called *hussee-looban;* it used to be called *Assa dulcis* in old works. Dr. Lindley has received the seeds of a Ferula called *hooshee*. *Anjedan*, the fruits or seeds (φυλλον of the Greeks,) is usually translated *Laserpitium*. The plant is called *Angoozeh* by the

Arabs. The root of *Silphion* is described by Arrian as affording food to herds of cattle on Paropamisus.

Assafœtida is produced in the dry southern provinces of Persia, as in the mountains of Fars and of Beloochistan, but chiefly in Khorassan and Affghanistan; likewise to the north of the Hindoo Khoosh range of mountains, where it was found by Burnes and also by Wood's expedition to the Oxus. Dr. Falconer found it in Astore, introduced the plant into the Saharunpore Botanic Garden, as mentioned in the author's "Product. Resources of India," and has obtained from it a small quantity of Assafœtida. He also sent home numerous seeds, which were distributed from the India House to several gardens; but the author has not heard whether any plants have been produced from them. But he has no doubt that some of those which the author is informed by his friend Dr. Christison are still in the Edinburgh Botanic Garden, were produced from these seeds, and not from those sent by Sir John M'Neill. The Assafœtida is conveyed on camels into India across both the Punjab and Bhawulpore, and is sold in large quantities at the Hurdwar Fair. It is also conveyed down the Indus and by the Persian Gulf to Bombay.

Two or three kinds of Fruit called Seeds are met with, which are said to be those of the Assafœtida plant; but there is no proof that more than one plant yields Assafœtida. Dr. Falconer, an excellent botanist, after examining the original specimens, considers the plant he saw in Astore to be the same as that figured by Kæmpfer; and Dr. G. Grant, who saw the plant at Syghan, says, as stated by Dr. Christison, that its roots, leaves, and flowering stem correspond on the whole with Kæmpfer's description, except that the root is deeply divided, like the outspread hand. The E. P. assign *Ferula persica* as probably yielding some Assafœtida. There is no doubt that its seed has been sent from the northwest of Persia as those of the Assafœtida plant: but there is no proof, nor indeed is it probable, that it yields any of the Assafœtida of commerce. The gum-resins of these Umbelliferæ are too similar to each other, for any but experienced pharmacologists to determine between *inferior* Assafœtida and varieties of Sagapenum or other Gum-resins.

As Dr. Falconer, the author's friend and successor as Superintendent of the East India Company's Botanic Garden at Saharunpore, has had excellent opportunities for examining the Assafœtida plant, both in its native sites and as cultivated by himself, he has favoured the author with the following full account of this important plant, which he conceives belongs to a genus allied to but distinct from Ferula.

NARTHEX (Falc. MSS.)

Calycis margo obsoletus. *Petala* ? *Stylopodium* plicato-urceolatum. *Styli* filiformes demum reflexi. *Fructus* a dorso plano-compressus margine dilatato cinctus. *Mericarpia* jugis primariis 5: 3 intermediis filiformibus, 2 lateralibus obsoletioribus, margini contiguis immersis. *Vittæ* in valleculis dorsalibus plerumque solitariæ (valleculis lateralibus nunc sesqui vel bi-vittatis,) commissurales 4—6 variæ inæquales, exterioribus sæpe reticulatim interruptis. *Semen* complanatum. *Carpophorum* bipartitum. *Umbellæ* pedunculatæ compositæ. *Involucrum* utrumque mullum—Genus inter Peucedaneas, calycis margine edentato, fructus vittis magnis, commissuralibusque inæqualibus et involucro utroque nullo distinctum; Narthex nuncupatum, a vocabulo, ναρθηξ apud Dioscoridem Ferulæ attributo.

N. Asafœtida (Falc.) Caul tereti simplici, petiolis dilatatis aphyllis instructo, foliis radicalibus fasciculatis, petiolis trisectis, segmentis bipinnatisectis, laciniis lineari-lingulatis obtusis, inæqui-lateralibus integris vel variè sinuatis decurrentibus.—Asa fœtida Disgunensis, Kæmpf. *Amœnit. Exot.* p. 535. Ferula Asafœtida. Linn. *Mater. Med.* p. 79. De Cand. *Prod.* iv. 173. Lindl. *Flor. Med.* p. 45.

Habit. in apricis inter saxa in valle "Astore" vel "Hussorah" dictâ prope Indum, ultra Cashmeer: indigenis Daradris "Sip" vel "Sup." Legi fructigerum prope Boosthon 21° die Septembris, 1838.

Descrip. A tall perennial plant, 5 to 8 feet high. *Root* fusiform, simple, or divided, a foot or upwards in length, about 3 inches in diameter at the top, with a dark grayish transversely corrugated surface: the summit invested above the soil with dark hair-like fibrous tegmenta, the persistent exuviæ of former years: cortical layer thick and tough, white or ash-coloured in the section, readily separable from the central core, and, like the latter, abounding in a white, milky, opaque, excessively fœtid, alliaceous juice. *Leaves* collected into a fascicle above the root, numerous, large, and spreading, about 18 inches in length in the adult plant, of a light green colour above, paler underneath, and of a dry leathery texture: the petioles terete amplexicaul, and channeled at the base, trifurcated a little above it, the divisions united at an angle with each other, like the legs of a tripod, and bipinnately sected: the leaf-segments linear-ligulated, more or less obtuse, entire or sinuately lobed, variable in their offset, being either alternate or opposite, for the most part unequal-sided, and decurrent along the divisions of the petiole, forming a narrow winged channel upon the latter. *Midrib* prominent on the under side, veins slender and anastomosing by numerous reticulations. The leaves observed in a young growing plant were about 9 inches in length, the leaf segments being from 2 to 4 inches long by 4 to 6 lines in width. *Stem* erect, terete, simple, striated, about 2 inches in diameter at the base, solid throughout, the spongy medulla being traversed by scattered tough fibrous bundles of vessels, invested with alternate, vaginating, dilated, aphyllous petioles, and terminating in a luxuriant head of compound umbels. General as well as partial involucre entirely wanting. *Umbels* 10 to 20 rayed, emitted from the dilated spherical head of a common peduncle, the rays 2—4 inches in length. *Partial umbels* with very short rays aggregated into round capitula varying from 10 to 20 rays in the fertile, and from 25 to 30 in the barren umbellulæ. *Flowers* small; barren generally mixed up with the fertile flowers(?). Border of the *Calyx* obsolete, being reduced to very minute denticular points. (Petals in the barren flowers small oblique, unequal-sided, acute, without an elongated acumen?). *Stylopodia* urceolate and plicated, with a sinuous margin. *Styles* filiform, reflected in the ripe fruit, rather short and slender, attached by a broad base. *Fruit* from 7 to 15, ripening on the partial umbels, supported on short stalks. *Mericarps* varying from broad elliptical to elliptical obovate, 5—6 lines long by 3 to 4 lines broad, flat, thin, foliaceous, but somewhat convex in the middle, with a dilated border, generally unequal-sided, of a dark reddish-brown towards the centre, lighter towards the margin, perfectly smooth, with somewhat of a glossy surface. Dorsal primary ridges 5: the three middle ridges filiform, slightly crested towards their confluence at the apex: the lateral ridges more obsolete, situated close to the margin, immersed in the substance of the border, but distinctly seen on the surface of commissure, and confluent with the middle nerve of the latter. The dilated border as wide as the space occupied by the three middle ridges. *Vittæ* in the dorsal furrows large and broad, occupying the entire width of the valleculæ, stretching from base to apex, usually solitary, but sometimes double in one or other of the middle furrows, and generally double or dichotomous, with a small branch in the broadest side of the margin, turgid with a fœtid juice: vittæ of the commissure varying from 4 to 6, very equal and variable: one very slender vitta, which is frequently dichotomous in two fine threads confluent at the apex, being placed close on either side of the middle nerve; another of the size of the dorsal vittæ, situated more outwards, and a third at the inner side of the dilated border, over the edge of the seed, more slender, but frequently subdivided and interrupted, so as to cover the border with a beautiful network of anastomosing ramifications. *Seeds* flattened, with plain albumen. *Carpophores* bipartite, persistent, twice the length of the pedicels. *Flowers* white?

The plant above described I believe to be the true "Asafœtida disgunensis," or "Hingiseh" of Kæmpfer. It does not appear to have been met with by any other botanist since it was examined *in situ* by that excellent and careful observer a century and a half ago.

I have compared my materials with Kæmpfer's description and figures (Amœn. Exot. p. 537,) and with his original specimens contained in the Banksian collection in the British Museum, and found them, so far as comparison could be instituted, to agree in every essential respect. The leaves "instar Pœoniæ ramosa" as represented in his figures, have the segments more obtuse and sinuated, and more alternate in their offset than they are represented in my drawing; but he describes them as being very variable in form, and some of the numerous leaf-specimens in his herbarium correspond with the figure which I have given. Kæmpfer mentions the umbellulæ as having only 5 or 6 rays, whereas I found them as numerous as 25 to 30 in the sterile capitula, and from 10 to 20 in the fertile ones. But he states that he never saw the plant in flower, and his description was probably drawn from the ripe state, in which the partial umbels occasionally present no more than 7 fruit-bearing stalks. There are two mericarps in his herbarium, agreeing exactly in form and in the developement of the dorsal juga with those met with by me in the Astore plant; but Kæmpfer's specimens are glued down on paper, and they seem to have undergone some decay or alteration by which the vittæ have been emptied, so that their number and size cannot be distinctly made out. But they appear to be solitary in the dorsal valleculæ, and there is no indication of the numerous striæ represented in the figures of the fruit given in the Amœnitates, which may have confirmed authors in the belief that Kæmpfer's Assafœtida plant belonged to a species of Ferula. These mericarps are perfectly smooth, and exhibit nothing of the "quadatenus pilosum sive asperum," described in the Amœnitates, p. 538. Dr. Lindley, in his Flora Medica, p. 45, after an abridgment of Kæmpfer's description, states, (it is not mentioned upon what evidence,) the vittæ of the back to be "about 20 or 22, interrupted, anastomosing, and turgid with Assafœtida: of the commissure 10." This account will apply to the fruit of a species of Ferula, but is entirely at variance with the characters presented by the fruits of the plants observed by Kæmpfer in Persia, and by myself in Astore.

Kæmpfer in his description says: "Folia sero autumno ex vertice progerminant, sex septem, et pro radicis magnitudine plura vel pauciora: quæ per brumam luxuriose vigent adultoque vere exarescunt." From the information which I gathered on the spot, confirmed by subsequent observation upon the growing plants introduced into the Botanic Garden at Saharunpore, the leaves of the Astore Assafœtida plant make their appearance in spring, and not in autumn, surviving through the winter, as stated by Kæmpfer, respecting the Persian form. With these slight discrepancies, his description might serve for the Astore plant.

Narthex, both in the characters of the flowers and fruit, and in its "Pæony-leaved" habit, differs widely from any known species of Ferula, and appears to constitute a distinct and well-marked genus.

In the Dardoh or Dangree language (the Dardohs being the Daradi of Arrian) the plant is called "Sip" or "Sup." The young shoots of the stem in spring are prized as an excellent and delicate vegetable.

The species would appear to occur in the greatest abundance in the provinces of Khorassan and Laar in Persia, and thence to extend on the one hand into the plains of Toorkestan on the Oxus north of the Hindoo Khoosh mountains, where it seems to have been met with by Sir Alex. Burnes,* and on the other to stretch across from Beloochistan, through Candahar and other provinces of Affghanistan to the eastern side of the valley of the Indus, where it stops in Astore, and does not occur in great abundance. The whole of this region, which constitutes the head-quarters of the gum-bearing Umbelliferæ, possesses the common character of an excessively dry climate, indicated in Berghaus's hygrometric map in Johnson's Physical Atlas by a belt of white.

Besides the gum-resin, the fruit of *Narthex Assafœtida* is imported into India from Persia and Affghanistan, under the name of "Anjoodan," being extensively employed by the native physicians in India: "Anjoodan" being the epithet applied to the seed of the "Heengseh," or "Hulteet," by Avicenna, also quoted by Kæmpfer, and used by the Indo-Persian and Arabic writers generally in describing the Assafœtida plant. Another Umbelliferous fruit is also imported with it, and sold under the name of "Dooqoo" (a word evidently connected with the δαυκος of the Greeks,) being recommended as an excellent substitute for "Anjoodan," which it closely resembles in its general appearance. This I found to be the fruit of a species of true Ferula; it is one of the two Assafœtida-like fruits mentioned by Dr. Royle as occurring in the bazaars of northern India. The species of Ferula yielding this fruit may furnish some one of the obscurely-known gum-resins resembling Assafœtida produced in Persia.

I have examined another kind of Umbelliferous fruit in the collection of Dr. Royle, labelled as "the seed of the wild Assafœtida plant collected and brought to England by Sir J. Macneill from Persia," which differs widely from the fruit both of Narthex and of Ferula, and belongs to another tribe of the order." H. F.

The above description of the genus Narthex, is accompanied with beautiful illustrations of form and structure.

The author appears to be perfectly at home, and speaks with authority from observation wherever the products of the East Indies are discussed.

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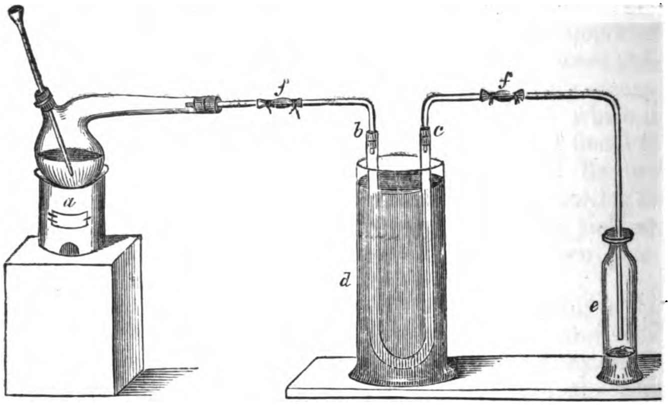
* Burnes mentions the plant as an annual, probably in consequence of the annual decay of the stems. He states that sheep browse on the young shoots.

We have sufficiently extended our notice of the Manual of Materia Medica and Therapeutics, to show that it possesses great merit, which will be a pretty sure guarrantee of its acceptableness to the profession. The department of Materia Medica is now so extended, that the treatises recently issued from the press, partake of the nature of Cyclopœdias. To the student, whether of pharmacy solely or medicine, an extended manual as the present cannot but be regarded with favour.

An American edition, with the introduction of all that pertains to the indigenous Materia Medica, and the Pharmacopœia of the United States, has just been published in large octavo, thus making the work easily accessible.

ART. LIX.—WÖHLER'S PROCESS FOR THE PREPARATION OF PURE HYDROCYANIC ACID.

Cyanide of potassium is prepared by fusing together 8 parts of dry ferrocyanide of potassium, and 3 parts of pure carbonate of potash containing carbon (ignited cream of tartar), and 1 part of charcoal in fine powder in a covered crucible; the mass while still warm is powdered, and placed in a stoppered bottle of such a capacity that when 6 parts of water are added the bottle is quite filled*. When the cyanide of potassium is dissolved, and the metallic iron is all deposited, the clear solution is poured into the retort *a*.



The retort is connected by means of a bent tube with the U-shaped tube *b c*; each arm of this tube is about 18 inches long and ½ to ¾ of an inch wide. It is filled with small pieces of fused chloride of calcium, with the exception of the first one-third of *b*, which contains small pieces of the above-mentioned black cyanide of potassium.

This tube stands in a cylindrical vessel *d* of equal height; from the arm *c* proceeds a long and rather narrow conducting tube, bent at a right, or any other convenient angle, into the vessel *e*; by means of the caoutchouc tubes *f f*, the apparatus is made more safe. When the apparatus is thus disposed, and all the junctions and corks found to be perfectly tight, the cylinder *d* is filled with ice-cold water, and the small and narrow flask *e*, destined to receive the acid, is immersed in snow or ice and salt, up to the neck.

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* The cyanide prepared by Liebig's process is less fit for the preparation of prussic acid; on account of the large amount of cyanate of potash it contains, much carbonic acid is disengaged, which renders the condensation of the acid far more difficult.

A cold mixture of equal parts of sulphuric acid and water is now poured through the funnel into the cyanide of potassium in the retort in very small successive portions; for 2 parts of the melted mass of cyanide of potassium 1 part of oil of vitriol is taken; the mass in the retort is so highly heated by this addition of the dilute acid as to begin to boil; the acid must therefore only be added at long intervals, taking care that no air enters with it. It is probable that a concentrated solution of tartaric acid would be preferable to the sulphuric acid. During the addition of the sulphuric acid a considerable quantity of prussic acid is developed, which would be carried out of the apparatus along with air; to avoid this the chloride of calcium tube is placed in cold water and the recipient in ice. When all the acid has been added, and the fluid in the retort no longer boils, the cold water is removed from the cylinder *d* by means of a siphon, and replaced with water at a temperature of 85° to 90° F. By this means the prussic acid previously condensed in the chloride of calcium tube is evaporated, and passes into the recipient *e*; at the same time the contents of the retort are brought to gentle ebullition, which is continued as long as prussic acid is disengaged. The tube *f* may be surrounded with ice also, when conveniently bent, so as to render the condensation of the acid more certain. Without the use of ice the preparation of the anhydrous acid should by no means be attempted; and even then, the operations and all experiments with this substance, should be conducted with the greatest care and precaution.—*Chem. Gaz. from Handwörterbuch der Chemie.*

ART. LX.—EXAMINATION OF THE CASTOREUM OF SIBERIA.

By Fr. Müller.

M. **Müller** some time since prepared a tincture of castor according to the Prussian Pharmacopœia, with one ounce of the Siberian castor to six ounces of alcohol. He was surprised at the great quantity of insoluble residue of an earthy aspect, and suspected a falsification, and examined with care the composition of this specimen of the drug.

It had been bought for good castor of Siberia, and according to its exterior aspect it would pass for such.—It had a considerable specific gravity, 1.515; it had a compact texture; it presented only on the exterior, and in several places, the thin membrane, which did not extend into the interior of the sack; and it had a deep blackish brown colour which grew lighter towards the interior, and presented at the centre a yellowish grey nucleus. Its odour and taste were decidedly those of good castor.

The result of the chemical examination of 100 parts was:

45.833	of resin and essential oil dissolved by alcohol.
2.256	of a soft resin dissolved by ether.
40.646	of carbonate of lime.
1.800	of gummy matter extracted by water.
8.125	of celular tissue.
1.340	—loss.
100.000.	

The results of chemists, on the proportion of the carbonate of lime in the two sorts of castor differ so much that they will not serve to judge of their purity; some admitting a greater amount of the calcarious salt in the Siberian than in the Canadian variety, and others giving the contrary opinion. The degree of dryness is undoubtedly a very important element of judgment in ascertaining the purity of castor; that which has been treated by M. Müller and in which the proportion of carbonate of lime surpasses that of other analyses, was very dry and hard, so as to be easily reduced to powder; its colour, form and odour would not admit of its being confounded with the castor of Canada. The enormous proportion of carbonate of lime, and the small quantity of celular tissue also would distinguish it from ordinary Siberian castor. Probably the organic substances had disappeared for the most part, owing to a pathological condition, and they have been replaced by carbonate of lime; a fact which has often been observed in the morbid secretions of the animal organism.

This examination shows what differences sometimes occur in the composition of certain medicines, and which are the causes of the want of accordance in the results of chemists.—*Jour. de Pharm. et de Chim., from Archiv. der Pharm.*

ART LXI.—IMPROVEMENTS IN MAKING THE CYANIDES AND FERROCYANIDES OF POTASSIUM AND SODIUM.

By James Laming.

The patentee, before describing the invention as communicated to him from abroad, has, for the better understanding of the improvement, detailed the chemical facts or principles upon which they are founded; these are as follows:

1. When animal matter, which contains nitrogen as well as hydrogen and carbon, is exposed to a high temperature, not exceeding low red, an equivalent of nitrogen combines

with three equivalents of hydrogen to form an equivalent of ammonia, and the carbon is separated.

2d. When ammonia is exposed to carbon at a full red heat, an equivalent of ammonia exchanges two of its equivalents of hydrogen for two equivalents of carbon, and thus becomes prussic or hydrocyanic acid.

3d. If free potassium or sodium be also present, the equivalent of ammonia parts with all its three equivalents of hydrogen, and the nitrogen which remains takes in their place two equivalents of carbon to form cyanogen, and one equivalent of potassium or sodium, as the case may be, to form a cyanide of the metallic base.

4th. When animal matter is exposed to heat, its temperature becomes gradually increased to low redness before it assumes that high temperature indicated by a full red colour; therefore, whenever animal matter is subjected to what is called destructive distillation, the formation of ammonia must take precedence, in point of time, to that of prussic acid or of the cyanides.

5th. When the oxide of potassium, or of sodium, or the carbonate of either of those oxides, is intimately mixed with carbon, and exposed to a heat approaching to whiteness, its metallic base is set free from the oxygen with which it was previously combined, and rises in vapour. If ammonia comes into contact with the mixture of carbon and alkali, or of carbon and alkaline carbonate, the separation of the metallic base from its oxygen takes place at a lower temperature—under such circumstances, a full red heat being sufficient. In the case of the carbonates, the metallic bases, potassium and sodium are liberated from the carbonic acid also, whenever they separate from their oxygen.

6th. Cyanide of potassium, or cyanide of sodium, by exchanging an equivalent of every three equivalents of its base for an equivalent of iron, is converted into the corresponding ferrocyanide, or what is called, in commerce, prussiate of potash, or prussiate of soda; and this change may be effected by causing the cyanides of the respective metals, dissolved in water, to come into contact with iron, or oxide of iron, in a state of division.

The ordinary way of combining potassium or sodium with cyanogen, preparatory to making the prussiate of potash, or prussiate of soda, for commerce, is to expose in iron pots an impure carbonate of one of those alkalies and animal matter to a red heat, and to trust for the necessary contact of the nitrogen and carbon of the animal matter with the metallic element, to the thorough incorporation of the ingredients of the pasty mass by stirring. While the temperature of the animal matter is approaching redness, ammonia is constantly being generated, and as it is volatile, it escapes and is lost; and this continues until the heat becomes great enough to convert the nitrogen and carbon of the animal matter into cyanogen, and to fix that cyanogen, by combining it with the metallic base of the alkali. Another source of loss is, the difficulty of causing the different elements contained in the pasty mass to combine; for, before each can be brought into contact with the other, by mechanical agitation, their temperature becomes elevated, and great part of the resulting nitrogenous gases, which are volatile, have time to escape. There is a third evil attending the ordinary process, namely, the proportion of carbon in animal matter, compared to its nitrogen, is greater than that in the alkaline cyanides; the greater part of this carbon, from its fixed nature, remains to solidify the mass from which the nitrogen so freely escapes; so that it becomes necessary to suspend the addition of the animal matter, on account of the mass being too solid for the chemical action to go on before enough of nitrogen has been combined to convert much of the alkali into prussiate.

Two patents have already been granted for methods of preventing the losses sustained in the ordinary way of making the prussiates of potash and soda. By one of these methods the ammonia which is liberated from a heated mixture of alkali and animal matter, is conducted first over the surface of fused alkali (the said alkali having no admixture of carbon) and afterwards into a vessel containing a solution of alkali. The other of these methods directs that the ammonia, which results from animal matter exposed to heat, be made to pass upwards and downwards through a series of vertical pipes, arranged on the principle of inverted syphons, heated to redness, and charged with a mixture of charcoal, potash, and iron, reduced to small fragments. With regard to the former of these methods, it is well known to chemists that fused alkali has no power of decomposing ammonia into cyanogen unless carbon be present; and with regard to the latter method, it is obvious that, as the materials, if brought into a state of fluidity or pastiness, must, of necessity, choke the passage of the pipes, the method demands that the mixture in the inverted syphons should be kept from losing its solid or granular state; and the continuance of that state is secured by the large proportion of infusible charcoal compared to the fusible potash, which the patentee prescribes, as fulfilling his intentions in a satisfactory manner.

Now, under the present invention, the patentee makes use of charcoal or other form of carbon, in powder, mixed with one of the alkalies, or its carbonate or other salt, capable, under the circumstances, of surrendering its metallic base to cyanogen. This mixture is constantly maintained in a fused state, so as to be fluid, or at least in a pasty condition, which is highly favourable for converting the metallic base of the alkali, or its salt, into a cyanide, and which takes place rapidly under such circumstances, when a current of ammonia gas is introduced to the fused mixture. The metallic base of potash, or soda, or of their compounds respectively, as the case may be, is liberated by the agency of the heated carbon, assisted by the affinity of the metallic base for the cyanogon, which is at the same time formed by the combination of heated carbon with the nitrogen of the ammonia; cyanide of the metallic base is thus produced, and this product is constantly augmented in quantity (the current of ammonia being continued) until great part of the alkali, or other compound of its base, has become converted into cyanide. When an alkaline carbonate is used, powdered charcoal to the amount of more than 30 per cent. of its weight may be added, without destroying the fluidity of the mixture if the temperature is raised to a full red. When the potash or soda is in a caustic state, a larger proportion of charcoal may be added; or, what is more advantageous, the mixture will remain fluid, although the heat be raised not so high. Whether the ammonia gas is passed through the mixture of carbon and fused alkali, or other compound of its metallic base (which is preferred), or over its surface, it is better to have more than one vessel charged with the heated materials, and so connected together by pipes, that the nitrogen of the ammonia, which escapes the chemical reaction in the first vessel, shall not pass through the whole series without combining. The apparatus thus acts on the principle of a series of Woolfe's bottles, and according to this invention all the vessels are made red-hot, except the last, into which water, or some liquid convenient for arresting the vapours of alkaline metal, is put; or otherwise the vapours might be lost. The first product, as in the common process for making prussiate, is a cyanide of the alkaline metal present, which may be dissolved out from the mass, technically called "metal," by boiling the latter in alcohol, of about 0·896 specific gravity, from which, filtered hot, it spontaneously separates, in great part, on cooling. To obtain the ferrocyanide, the metal is to be treated in the usual way, namely, its soluble parts dissolved in water, then treated with iron, the solution evaporated, and when sufficiently concentrated and clear, set aside to crystallise; and the rough product is afterwards purified by recrystallisation

The patentee states, that he does not claim the invention of any process for dissolving out or obtaining either cyanide or ferrocyanide from the compound termed "metal;" nor does he claim the construction of apparatus wherewith the process or processes may be carried on: but he describes some arrangements which have been found to answer. One of these consists of three iron air-tight covered pots, communicating with one another in the manner of ordinary Woolfe's bottles; that is to say, the induction-pipe of the first pot reaches to near its bottom—its eduction-pipe reaches down the interior of the second pot to near its bottom, and the eduction-pipe of this second pot terminates in like manner in the third pot; while the eduction-pipe of the latter plunges beneath the surface of some water or other liquid, convenient for oxidising and arresting vapours of alkaline metal. Each of the pots has a man-hole in its cover, by means of which it may be charged and discharged, and a door by which it may be perfectly closed. Each covered pot is so set in a furnace as to be heated to a temperature great enough to keep its contents in a state of constant fusion. Its charge, when fused, should about half fill it. By the use of this apparatus, the ammonia which is forced into the first pot, by reason of its own elasticity under the pressure attending its assumption of the gaseous state, passes through the fluid mixture of fused alkali and carbon in that pot, being there decomposed into nitrogen or cyanogen, and as cyanogen, combining with and saturating the alkaline metal present; after which, the ammonia or its nitrogen or uncombined cyanogen, which results from its action on the carbon still remaining in that pot, passes into the second pot, to convert the alkaline metal, there present, into a cyanide. In like manner the ammonia or its nitrogen, or the resulting cyanogen, may arrive in the third pot; then is the time for stopping the operation, in order that the two first pots may be emptied and re-charged. Owing to the volatility of the alkaline metals at high temperatures, the pipes of communication between the pots are apt to become obstructed; for this reason they are proposed to be made straight, and joined together at right angles, in such a manner that by removing a screw-plug from the end of each rectilinear piece, the passage through it may be cleared by passing into it a short rod of iron; in order that this process need not be often repeated, the diameter of the pipes should be as great as convenience admits of.

The patentee next describes a modification of the preceding apparatus, wherein no pressure is required to overcome the resistance opposed to the current of ammonia by the fluid mass into which the induction-pipes of the preceding apparatus are immersed. In this modification, all the induction pipes stop short at the covers of the pots, except that of the open pot, which may be allowed, without much inconvenience, to dip below the surface of the water or other liquid intended to arrest the metallic vapours.

The ammonia gas, in this case, urged forward by an inconsiderable amount of pressure, comes into contact with the surfaces of the fused ingredients in the several pots in succession, until it is either decomposed and its nitrogen absorbed, as in the preceding case, or escapes by the last eduction-pipe of the series; to prevent which, either the number of pots may be increased, or, what is better, each of the three should be furnished with agitators, moved by machinery or labour. When the latter arrangement is adopted, each pot should be furnished with a lofty conical cover, containing, at its apex, a stuffing-box, in which the axis of the agitator turns, and which is kept sufficiently cool by a stream of water running through a small cistern, which embraces the stuffing-box. With this apparatus, the fused ingredients may be either in a fluid, semi-fluid, or pasty condition.

The patentee claims the making of the cyanides and ferrocyanides of potassium and sodium; or, as they are called in commerce, prussiates of potash and soda, in any suitable apparatus, by passing ammonia (either pure or mixed with such other gases as do not prevent the desired result) over the surface, or through the mass (according as the induction-pipes may dip or not below the surface) of potash, or soda, or other compound of potassium or sodium (capable, under the circumstances, of setting free its metallic base) in a state of fusion by heat, and mixed with charcoal or other form of carbon in powder, and in such proportion as to be adequate to effect, without destroying by its bulk, the fluid, semi-fluid or pasty condition of the resulting mass. And, further, he claims, for the process or processes of this invention, the sole use of ammonia, or mixture, or combination of ammonia with other gases or vapours, whatever be the source from which it is obtained; provided always that in such mixture or compound there be no substance present capable, by its nature, of preventing the desired result. He claims, for example, the application to this invention of ammonia or carbonate of ammonia, obtained from gas-water, from urine, from the liquor condensed in the distillation of bones or other animal matter, or from one or other of the salts of ammonia, or a solution of ammonia; and also the ammonia or carbonate of ammonia which is obtained directly, mixed with other gases, in the carbonisation of bones, and other animal matters, and in the chemical treatment of guano. Whatever be the source from whence the ammonia is obtained, it is desirable that it should be made as free from the vapour of water as possible before it is introduced to the fused materials; for this purpose the substances from which it is to be eliminated may be dried, or else the ammonia may be passed, in an elastic state, in contact with some substance known to chemists to be convenient for desiccating that gas.

Instead of obtaining the ammonia by a separate process, or from a distinct vessel, the inventor sometimes causes it to be given off from animal matter contained in the vessel or vessels in which the cyanide is formed. For this purpose it is better to use the potash or the soda in a caustic state, causing it, while in that condition, to dissolve the animal matter. The following is the mode of proceeding:—A caustic solution of alkali, in water or other convenient liquid, is first made boiling hot, and to it, while boiling, as much animal matter is added as it will readily dissolve; the solution is next evaporated to dryness, and the mass preserved in that state for use. When a portion of this mass is put into each of the heated vessels, except the last, of such a series as has been described, and the last heated vessel is charged with carbon, mixed with some convenient compound of an alkaline metal, as before stated, then the ammonia, which escapes from any one of the vessels in the series, will have to pass through one or more subsequent vessels, and thus tend to suffer decomposition; the resulting nitrogen being converted into cyanogen, and then being absorbed. This admits of the cheaper kinds of animal matter being used—such as the undried flesh and viscera of carrion, and old woollen flock and rags, which, by reason either of humidity or too great volume, cannot conveniently be mixed in their natural state with red-hot alkali. The patentee claims this modification of the process as part of the invention for which this patent has been granted. Sometimes the mass resulting from the desiccation of the solution of animal matter in caustic alkali is put into red-hot open pots; in this case, much ammonia is lost, but the improvement which is introduced by replacing the ordinary mechanical admixture by an intimate chemical combination, affords a greater product in prussiate than can be obtained from an equal quantity of animal matter treated in the ordinary way.

Chemist, from Newton's Journal.

ART. LXII.—ON TURPENTINE-CAMPHOR.

By M. Wiggers.

The author has communicated some experiments on turpentine-camphor, the best proportions for obtaining which in large quantities he found to be 8 parts oil of turpentine, 2 nitric acid of 1.25 to 1.3 spec. grav., and 1 part alcohol of 0.863 spec. grav. This mixture is frequently shaken for some days until, on being set aside at 68°–78°, the camphor separates from the liquid. Turpentine-camphor is only formed from that modification of the oil of turpentine which yields a crystalline compound with muriatic acid; and no camphor could be procured from an oil which could not be combined with muriatic acid. Sulphuric, muriatic and acetic acids act in precisely the same manner as nitric acid.

The camphor obtained, according to this process, is slightly coloured; it is purified by recrystallization, for which purpose it is dissolved in boiling water. The analysis of this pure camphor proved it to be a hydrate of the oil of turpentine corresponding to the formula C^{20} H^{16} 6aq. :—

Carbon, . . .	63.31	20	63.21
Hydrogen . . .	11.55	22	11.55
Oxygen		6	25.24

When this body is heated to melting, it loses 2 equiv. water, and the fused body thus obtained is C^{20} H^{16} + 4aq.

If either of these two hydrates be placed in a vessel, and a current of dry muriatic gas be passed into it, the camphor becomes liquid, disengages heat, and two colourless layers are obtained; the lower one is muriatic acid, formed from the water of the camphor; the upper one is of an oily consistence, and is a combination of oil of turpentine with muriatic acid, C^{20} H^{16} HCl.

On treating turpentine-camphor with hydriodic acid, an analogous compound was not formed, but the hydrate of the oil of turpentine with 1 equiv. water. The bodies examined are therefore combinations of oil of turpentine with 1, 4 and 6 equivs. water, and with 1 equiv. muriatic acid.—*Chem. Gaz. from Ann. der Chem. and Pharm.*

ART. LXIII.—ORSERVATIONS ON MAGNESIA AS AN ANTIDOTE TO ARSENIC. By Dr. Christison.

Dr. Christison's attention was lately turned to this subject by a case of poisoning with arsenic having come under his notice, in which magnesia seemed to prove very serviceable. Immediately afterwards he observed it announced in a French scientific newspaper, 'L'Institut,' May 20, that a paper had been read before the French Institute two days before by M. Bussy, to prove, "That magnesia, not strongly calcined, removes arsenic entirely from a state of solution in water; that this is effected still more completely by magnesia in the gelatinous state; and that animals which have taken arsenic are invariably saved if made to swallow magnesia." While waiting for the details of M. Bussy's inquiries, Dr. Christison made a few experiments to ascertain the amount of the action of magnesia; and he found that the dense magnesia of the shops exerts very little action in removing arsenic from solution in water; that a very light magnesia, now largely manufactured at Belfast, and quite free of carbonic acid, will remove about a twenty-fifth of its weight of arsenic from solution in water, when agitated with the solution for a few minutes; so that even ammoniacal nitrate of silver does not any longer indicate the presence of arsenic; that the same magnesia will remove about a twelfth of its weight of arsenic if agitated occasionally for a period of 8 or 12 hours; that this proportion is removed entirely in less than 3 minutes if the mixture of magnesia and water be previously near the temperature of 212°; and that the same proportion is removed with as much speed at ordinary temperatures, if the magnesia be used in the form of gelatinous pulp, as thrown down in a cold solution of sulphate of magnesia by solution of caustic potash and washed with cold water.

It is well known that magnesia was proposed many years ago by Mr. Hume of London as an antidote for arsenic, and that several cases have been published in which it appeared to have been of service; but that its general utility has been doubted or denied on account of the apparent want of chemical action between oxide of arsenic and magnesia. M. Bussy's inquiries will probably clear up these difficulties. Meanwhile it appears probable, from the experiments described above, that the general belief in the want of action between magnesia and oxide of arsenic has arisen from the circumstance that for a long time no other magnesia has been in current use in medical practice in Britain except the dense variety, which appears to exert very little action on arsenic in solution on account of its great density.

Dr. Christison promises more accurate experiments and a statement of the successful case hereafter. Meanwhile it appears advisable that, when magnesia is used as an antidote, and cannot be promptly obtained in the gelatinous state, the light calcined magnesia should alone be employed, and in the proportion of between 30 and 50 parts to 1 of arsenic.—*Chem. Gaz. from Monthly Journal of Med Science.*

ART. LXIV.—ON A NEW PROCESS FOR OBTAINING FORMIC ACID, AND ON THE PREPARATION OF ALDEHYDE AND ACETIC ACID BY THE USE OF THE BICHROMATE OF POTASSA.

By Professors W. B. Rogers and R. E. Rogers of the University of Virginia.

I. *Process for Formic Acid.*

Since the important discovery of Döbereiner, that formic acid is evolved from a mixture of tartaric acid, peroxide of managanese and sulphurie acid, the progress of research has shown that in a large proportion of cases, where organic matters are exposed to powerful oxidating agencies, this acid is among the products developed; and hence several other processes have been devised for its preparation, on the large scale and in the laboratory. Of these the one generally in use consists, as is well known, in distilling a mixture in prescribed proportions, of peroxide of manganese, dilute sulphuric acid and starch or sugar.

The inconsiderable amount of acid yielded by this process, and its usually large admixture with other products, especially sulphurous acid, suggested to us, some time ago, the trial of bichromate of potassa, as a substitute for peroxide of manganese, and has since led us to a method of operating, which we think presents decided advantages over that in general use.

When bichromate of potassa, dilute sulphuric acid and sugar are mingled in proper proportions and in a proper order, a large amount of formic acid is developed, of which part passes off during the first violent reaction, and the remainder is separable by gentle distillation. Repeated experiments have convinced us that by mingling all the materials at once, before placing them in the retort, a comparatively small product is obtained, partly from its being volatilized by the high temperature attending the reaction, and partly, we think, because more of the sugar is carried to its highest stage of oxidation in the forms of carbonic acid and water. We have therefore been led to another, and we believe, better mode of operating, of which the following details will serve as an example.

Introducing into a retort, capable of holding about one quart, 800 grains of bichromate of potassa and 10 cubic inches of water, we gently heat the mixture so as to dissolve the larger part of the bichromate. We then add 300 grains of powdered white sugar, and adjusting to the tubulure a perforated cork and pipette with gum-elastic bag for the gradual introduction of sulphuric acid, we slowly inject about 1 cubic inch of the latter upon the mixture. By regulating the addition of the acid and occasionally intermitting the slender stream, the violent reaction which ensues is prevented from occasioning any very great intumescence. During this stage of the operation, upwards of 2 cubic inches of a clear but feebly acid liquid passes over into the receiver. When the action has in a good measure subsided, we add 5 cubic inches more of water, and apply a gentle lamp heat, continuing the addition of the acid, by allowing it simply to drop from the pipette, until another cubic inch has been introduced. The liquid which now passes over is much stronger in formic acid than in the preceding stage, and the distillation may, without impairing the purity of the product, be continued until about 7 cubic inches have been received. By urging it much beyond this point sulphurous acid will be evolved.

One hundred grains of the liquid thus obtained is capable of saturating about seven grains of dry carbonate of soda. Its purity is such as to fit it for immediate use in illustrating the striking reactions of formic acid and the formiates. Thus—

1. On adding a small portion of it to a solution of nitrate of silver previously curdled by ammonia, and applying heat, the silver is promptly reduced with a lively effervescence of carbonic acid.

2. With a solution of bichloride of mercury, aided by heat, it causes a precipitation of calomel and the evolution of hydrochloric and carbonic acids.

3. Combined with soda it forms a white salt readily carbonized by heat and passing into carbonate.

4. It is not blackened by sulphuric acid, but the soda salt acted upon by this acid evolves carbonic oxide with brisk effervescence.

5. This salt heated with solution of nitrate of silver or nitrate of mercury, precipitates the metal with evolution of carbonic acid.

All these results are so prompt and striking as to evince but little contamination of the formic acid with other products.

On comparing this process with that commonly employed we are convinced of its superiority, first, on account of the exemption of the product from SO_2, and in a great degree from other impurities; second, from the much larger amount of formic acid obtained by it from an equal weight of the oxidising material, sulphuric acid and starch or sugar; and third, from the ease with which the action is controlled.

According to Liebig, (Chem. Org., p. 567,) 10 parts of starch, 37 parts of peroxide of manganese, and 30 parts of sulphuric acid, yield 3.35 parts of an acid liquid, of which 100 grains saturate 15 grains of carbonate of soda. This corresponds to 7.18 parts of liquid such as we obtain. We have thus by the old process 7.18 parts of liquid of equal acidity with our product, while the aggregate weight of the starch, sulphuric acid, and peroxide of manganese is 7 7. By our process we have about 1800 grains of a similar acid from 2100 grains of sugar, bichromate of potassa and sulphuric acid. In other words, *by the new process, we procure about nine times as much formic acid from the same weight of the three reacting materials, as by that hitherto in use.*

II. *On the preparation of Aldehyde and Acetic Acid by the use of the Bichromate of Potassa.*

In the process described by Liebig, (Chem. Org., p. 378,) and which is the one hitherto generally used for preparing aldehyde in the regular way, the product is obtained from the reaction of peroxide of manganese and sulphuric acid upon dilute alcohol. This operation furnishes a liquid which is so weak in aldehyde, and so mixed with water and formic ethers, and as we have found with acetic acid also, as to present the characteristic reactions only in a feeble degree, and to require two rectifications over chloride of calcium, before it can be used in forming the subacetylite or aldehydite of ammonia.

In the course of some experiments upon the reactions of bichromate of potassa and sulphuric acid upon alcohol, we have been led to a process which affords a larger and much purer product, and which is entirely under the control of the operator. The distinctive features of this method are the substitution of bichromate of potassa for the peroxide of manganese, and the peculiar mode of bringing the reacting materials together. In the use of the bichromate we have since found that we were anticipated by Prof. Kane, who, at page 922 of his Elements of Chemistry, recommends it as a means of obtaining a purer product, and specifies briefly the manner in which he conducted the process. As however his method is not noticed in other chemical works, and as our mode of proceeding and some of the results we have obtained, are, we think, not without novelty and interest, we deem them worthy of a brief notice in your Journal.

When alcohol is added to a strong aqueous solution of chromic acid in a retort, a very brisk reaction ensues, and upon applying a gentle heat there passes over a clear liquid, containing a considerable amount of aldehyde, with a faint trace of acetic and probably formic acids. The presence of the aldehyde is readily shown by adding a few drops of the liquid to a solution of nitrate of silver previously curdled by ammonia, and then gently heating the mixture. The oxide is speedily reduced, forming a brilliant metallic coating on the sides of the glass.

Substituting for the chromic acid of this experiment, a mixture of bichromate of potassa and sulphuric acid, and blending with this a quantity of common alcohol, the reaction is extremely violent, a large volume of carbonic acid is evolved, and the liquid which distils over, contains, with other products, *much aldehyde and acetic acid.* To obtain either of these substances but little mingled with the rest, special attention must be paid to the proportions in which the bichromate, sulphuric acid, and alcohol are mixed, and to the order in which they are brought together. Thus, in all our experiments, we found, that when *alcohol* is added *in small quantities at a time* to a mixture of the bichromate and sulphuric acid the distilled product is almost *pure acetic acid*, but when *sulphuric acid* is *slowly dropped* into a mixture of the salt and alcohol, the liquid which passes over contains little else than *aldehyde.*

This remarkable difference in the products is, we think, readily explained by the different intensity of the oxidating power in the two cases. In the former, the alcohol, as it falls into the mixture of bichromate and sulphuric acid, being surrounded on all sides by free chromic acid, is carried rapidly through the lower stages of oxidation, corresponding to aldehyde and aldehydic acid, until by the addition in all of 4 equivalents of oxygen, and the elimination of 2 equivalents of water, it is converted into acetic acid. In the latter case, the sulphuric acid, dropping slowly into the mixture of alcohol and bichromate, liberates but a small quantity of chromic acid at any one time, and thus limits the oxidation of the alcohol in great part to the first stage, or that of the formation of aldehyde.

From the observation of these facts, we were led, after a number of comparative trials, to the following process for the preparation of aldehyde.

Equal weights of powdered bichromate of potassa and alcohol, sp. gr. 0.842 being placed in a capacious retort, connected with a receiver and the usual means of refrigeration, we adapt to the tubulure a pipette, charged with sulphuric acid, and whose stem reaches nearly to the surface of the liquid, the top of the pipette being furnished with a strong gum-elastic bag for injecting the acid into the mixture beneath. We now slowly add the acid, taking care to avoid excessive reaction, by sometimes allowing it merely to drop spontaneously from the pipette, and again when the action subsides accelerating its flow by pressure. At this period of the operation, the heat evolved in the retort is sufficient to carry over into the receiver a considerable volume of the aldehydic liquid; and, as much carbonic acid is at the same time disengaged, the tubulure of the receiver should only be loosely closed. Having thus added gradually a weight of sulphuric acid equal to about 1½ times that of the bichromate, we apply a gentle lamp heat and continue the distillation as long as the aldehydic liquid passes over. When the reaction is most energetic, white fumes are evolved, which, falling from the beak of the retort into the receiver, are so dense that they may readily be poured from the latter through a funnel into a narrow necked bottle. These, when condensed, form a clear liquid consisting chiefly of aldehyde.

By this process 1500 grains of bichromate of potassa and the same amount of alcohol have on repeated occasions yielded us about 8 cubic inches of a clear liquid, containing but slight traces of acetic acid or other extraneous matters, and possessing all the characters of a nearly pure mixture of aldehyde and water.

The product thus obtained is sufficiently rich in aldehyde to exhibit instantly and strikingly all the characteristic reactions of that substance. It may, therefore, without rectification, be employed in class-room experiments and in testing for silver.

A few drops of this liquid, added in a test tube to a solution of nitrate of silver previously curdled by ammonia, quickly converts the oxide into metallic silver, which attaches itself as a brilliant coating to the glass. In describing this characteristic property of aldehyde, Liebig and others appear to regard the *application of heat* to the mixture as necessary to the effect, (Chem. Org., p. 377.) We have found however that the aldehydic liquid of the above process, as well as the more concentrated aldehyde procured from it by distillation over chloride of calcium, causes a complete and brilliant reduction of the oxide of silver in a few seconds *at ordinary temperature*, and that the same effect results even *when the tube is immersed in snow*, but in this case the change requires two or three minutes for its completion.

Heated with hydrate of potassa the liquid becomes yellow, then of a deep reddish brown colour, and in a little while yields floating flakes of the characteristic *resin of aldehyde.*

On adding to the liquid an excess of caustic baryta in the cold, little or no action is manifested; but as soon as heat is applied, the mixture assumes an intense opaque yellow colour like that of chromate of lead, which by continuing the heat passes into a deep rich brown, as in the preceding experiment.

The proportion of aldehyde in the liquid as it comes from the receiver in the above process, is such, that to prepare *aldehydite of ammonia*, we may dispense with the two successive distillations from the chloride of lime directed by Liebig, and use the fresh product at once for this purpose. We therefore add to the liquid about half its bulk of sulphuric ether, and pass a stream of ammonia into the mixture. As the aldehyde becomes saturated, the compound in question falls in an abundant deposit of brilliant transparent rhombohedral crystals. From this, as is well known, perfectly pure aldehyde is prepared by the reaction of dilute sulphuric acid.

In some experiments made to determine the delicacy of aldehyde as a test for oxide of silver, we obtained the following results:—

1. A solution of 1 part of nitrate of silver in 1000 of distilled water, when heated gently in a test tube with a drop or two of aldehydite of ammonia, formed a brilliant metallic pellicle on the inner surface of the glass.

2. A solution containing 1 part in 2000 produced the pellicle in distinct spots and not continuous as in the former case. At the same time the liquid became of a deep greenish purple colour, and although only one quarter of an inch thick was nearly opaque.

3. A solution of 1 part in 10,000 gave no adherent pellicle, but on continuing the heat for two or three minutes became strongly coloured, presenting a deep greenish purple by transmitted, and a dull olive by reflected light.

4. In a solution of 1 part in 20,000, the peculiar greenish purple tint was still quite decided, and even when the solution was diluted so as to contain only $\frac{1}{40000}$th of nitrate of silver this colour was very distinctly manifested after heating it sometime with aldehydite. Compared with the faint opalescence caused by the addition of chloride of sodium to the same solution, this effect of the aldehyde appeared to be the more striking of the two.

The peculiar purplish tint of the liquid, remarked in these experiments, is evidently due to the finely divided metallic silver held in suspension, and affords therefore a striking confirmation of the statement of Dupasquier, that not only gold, but silver and other opaque bodies, present this hue when greatly subdivided and viewed through a clear suspending medium, (Comp. Rend., No. 1, July, 1845.) It may be added that the same hue is developed when a very dilute solution of nitrate of silver is subjected to the reducing action of a formiate.

Allusion has already been made to the production of *acetic acid* in large amount by a modification in the above process. For this purpose the powdered bichromate and the sulphuric acid in the proportion of about 2 to 3, are to be first mixed in the retort so as to develope a large amount of free chromic acid. The alcohol is then introduced from the pipette as in the former case and with like precautions. During the violent action that ensues, much acetic acid passes over without the aid of external heat. When the alcohol thus added amounts to about twice the weight of the bichromate employed, the action having subsided, we apply a gentle lamp heat and obtain a large additional quantity of the acid. This we have found to be free from sulphurous acid and to contain little more than a trace of formic acid and aldehyde.

American Journal of Science and Arts.

ART. LXV.—NEW PROCESS OF REFINING AND PURIFYING ANIMAL AND VEGETABLE OILS AND GREASE.

By Peter Bancroft.

The nature of this invention consists in a process or processes of refining or purifying certain vegetable and animal oils, whereby they are better suited for lubricating the working parts of machinery; also in a process of refining or purifying tallow, to improve its lubricating quality; and likewise in a process of purifying and sweetening inferior descriptions of lard, and rendering them fit for human food, and applicable to all purposes for which the best Irish lard is now used. The vegetable oils which the patentee proposes to refine for the above purpose are, the common olive oils, Galipoli, Spanish, Portugal, Sicily, and such like qualtities of olive oils. It is well known that these oils, when applied in their impure state to the working parts of machinery, quickly become glutinous, act injuriously upon the brass-work, and impede the proper working of the machine. This effect is produced by the action of the air upon the impurities contained in the oil, when the oil is exposed in small quantities. To remove this hurtful matter, the oil, when heated to about 90° or thereabouts, is treated with a strong solution of potash or soda, either in the state of a carbonate, or made caustic by lime. The use of the alkali, in a caustic state, is generally preferred, in consequence of its producing less effervescence in the oil, and the operation being more quickly finished than when the carbonates of either of the above alkalies are made use of. The specific gravity of the alkali solution may be 1.2, or even stronger. During the time that the alkali is being added, the oil is to be kept in a constant state of agitation to cause a thorough mixing. In order to ascertain when the operation is completed, and a sufficiency of the solution is added, the following test may be used: Put a small portion into a glass bottle, or any other convenient vessel, and add to it a solution of the alkali in excess. Shake it well, and then allow it to remain at rest for a quarter of an hour, or until the alkali has settled to the bottom of the vessel. Should the alkali settle quite clear, without causing a thick deposit to take place, the oil is sufficiently refined; if it does not remain clear, but carries down with it a thick soapy matter, more alkali is added to the oil under operation, until, on further trial, this effect takes place. The quantity of alkali required will depend entirely upon the quality of the olive oil operated upon. In practice it will be found that some qualities require as much as 8 per cent. of solution of specific gravity 1.2, while other qualities do not require more than 3½ per cent. When the above operation is completed, the oil is allowed to remain at rest for twenty-four hours, or until such time as the thick soapy matter, formed in the oil by the alkali, has subsided; the supernatant oil may then be run off and passed through a filter. It is stated, that oil thus operated upon will not tarnish the most delicate brass work, nor will it become thick and glutinous upon exposure to the air. The animal oil which the patentee prepares for lubricating purposes is the oil expressed from lard; and the process of refining this oil is exactly similar in all its details to that described above.

Before explaining his mode of purifying tallow, so as to make it fit for lubricating, the patentee remarks that all tallows are not applicable, those suited to the purpose being such as are termed in commerce Y. C., of light yellow colour, and sweet or good home-rendered tallow. Tallow of such description is melted by steam or other heat, and when the tallow has become fluid, but before it has become much heated beyond its melting point, a strong solution of potash or soda, either caustic or in the state of a carbonate, and of specific gravity 1.2, or thereabouts, is added, the tallow being kept in constant agitation during the introduction of the alkali. Upon the first introduction of the alkali solution a very thick soapy matter is precipitated; the operation is completed when, upon a further addition of the alkali, this effect ceases to be produced; the tallow is then heated to about 180° or 200° of temperature, after which it is allowed to rest for twenty-four hours or more, according to the quantity operated upon and the heat of the weather. When it is perceived that the tallow in cooling is becoming slightly opaque, it is run off into casks, and while cooling must be well stirred to prevent it from granulating.

The process of refining and sweetening American and inferior lard is as follows: In using American lard, it is, in most cases, too soft and oily; it is, therefore, advisable first to extract a portion of the oil, by pressure; the lard is then melted by steam or other heat, and a strong solution of potash or soda, or carbonate of these alkalies, is added, as before, with constant agitation of the lard. It should be observed, that a weak solution of the alkalies is to be avoided, and that the stronger or denser they are made, the more perfectly will they separate the impurities from the oils and fats. The matter, which is precipitated in the refining of the above oils and fats may be used in the manufacture of soap; the nature of the soap depending upon the alkali made use of. If it is required, an inferior oil or fat may be recovered from the deposit formed by neutralising the alkali by an acid. For this purpose the sulphuric acid, diluted with water, may be employed.

The patentee states that he is aware of the alkalies, potash and soda, having been used and recommended for the purification of oils and fats, but to the best of his belief they have never been employed for the purification of the oils and fats mentioned above, when those oils are refined for the purpose of being applied as described. He therefore claims the refining and purifying of olive oils, lard oil, tallow, and lard, for the purposes already mentioned, by treating them as herein described.—*Newton's Journal.*

ART. LXVI.—ON THE INFLUENCE OF PROTOXIDE OF NITROGEN UPON VEGETATION.

By M. Vogel, Jun.

It is generally admitted that nitrous oxide is not capable of sustaining life, although a candle blown out is relighted, and burns with more brilliancy in this gas than in atmospheric air. The rapid combustion of the candle is owing to the easy decomposition of this gas at a high temperature —a decomposition which cannot be effected by the lungs in respiration; while air, which is but a simple mixture of oxygen and nitrogen, readily parts with its oxygen in the act of respiration, I have made some experiments to ascertain the influence of the protoxide of nitrogen on vegetation. The gas which I employed was obtained by heating perfectly pure nitrate of ammonia. I placed some seeds of cress, scattered over a moistened sponge, in a white glass flask, filled with protoxide of nitrogen. The seeds were introduced into the flask under water, and all atmospheric air removed as much as possible from the pores of the sponge by gently pressing it. A sufficient quantity of water was left in the flask to produce germination; the vessel was then closed hermetically.

For the sake of comparison, I placed in a flask filled with air another sponge covered with seeds of cress. In the course of a few days the seeds in the last vessel were developed, and began to form leaves. The case was different with the seeds in the protoxide of nitrogen; there not the least trace of the development of the germ could be observed; nevertheless, the seeds had swollen, and were covered with a mucous layer, without having experienced any other change which could lead to the supposition of their having germinated. After two weeks I removed the sponge with the seeds from the flask; but as soon as they were exposed to the air they began immediately to germinate, proving that during their stay in the protoxide of nitrogen they had not lost the power of germinating, while they do not germinate when they have been in contact for some time with several other gases.

The gas in which the seed had been kept for two weeks had experienced no alteration; it did not contain the least trace of carbonic acid, and still set light to the glowing wick of a candle.

To ascertain the influence of this gas on plants already developed, I introduced into a flask filled with protoxide of nitrogen a sponge covered with plants of cress perfectly formed, observing the precautions mentioned above; for two days the young plants continued unaltered, but on the third they acquired a yellow colour, and towards the end of the week they drooped. Exposed to the air, they re-assumed, in a few days, their verdure and erect position.

It must be remarked, that the above experiments were made not only upon seed, but also upon the plants, and that the oxide of nitrogen was exposed to the direct rays of the sun, and kept in the shade, but that in neither case decomposition of the gas was effected.—*Chem. Gaz. from Journ. de Pharm.*

ART. LXVII.—ON THE EXAMINATION OF BALSAM OF COPAIBA. By M. OBERDOFFER.

Balsam of copabia has latterly produced considerable embarrassment among druggists with respect to the necessity of its being completely soluble in alcohol. We have often heard the importers declare, that they would no longer deal in this article, unless some new mode of examining it was resorted to. This circumstance induced me, at the request of a respectable mercantile house in Hamburgh, carefully to study the subject again.

If we compare the different kinds of balsam of copaiba, which are met with in commerce, both old and new samples, we shall find a well-marked difference. Formerly, we usually obtained a perfectly transparent balsam, thick, and completely soluble in alcohol, forming a transparent soap with caustic potash, and leaving behind a brittle resin after having been boiled a long time in water. It was seldom met with in a more fluid state, frequently it was more firm in its consistence, more thickened by age, and when agitated with a solution of caustic potash, the latter caused the separation of a transparent soap, with greater difficulty, and only after the lapse of several days. It was sometimes even necessary to employ a slight degree of heat, so that it has frequently been looked upon as adulterated, notwithstanding its complete solubility in alcohol. This last idea originated at a time when balsam of copaiba was at a high price, and, as old castor oil was to be obtained at a much cheaper rate, it was frequently employed to adulterate the balsam. This adulteration only became manifest by the semi-fluid residuum left behind, after the evaporation of the pure essential oil, and the pure thickened balsam, considered as adulterated by a mixture of castor oil, was that alone which justified the suspicion, by this method.

Latterly, the balsam, principally brought from Mexico and the West Indies, frequently appears in commerce in a very fluid state, and occasions the complaints in question. The cause of this difference can only be attributed to its being newer, or less dense, or to adulteration, but in most cases to the first of these causes.

M. Gerber, in 1829, examined various specimens of bal sam of copaiba; he found—

	Recent balsam.	Old balsam.
Essential oil . .	41.00	31.70
Hard yellow resin .	51.38	53.68
Soft brown resin .	2.18	11.13
Water and loss . .	5.44	4.10

M. Stockhardt, last year, directed our attention to an extremely liquid balsam which had all the appearance of good balsam; two specimens of which, obtained from different sources, left, after the complete evaporation of the essential oil, the one 42, the other 43.5 of brittle yellow resin; while, according to M. Gerber, the resent balsam yielded 53.38, and the old sample 64.78 of dry resin. A fluid balsam, whose properties I am now studying, only left, after having been boiled a sufficient time in water, 40 per cent. of a brittle and perfectly dry resin.

Having been for a length of time, accustomed to a thick balsam, we receive less favourably a liquid balsam, which is also not so well adapted to the preparation of pills, for which purpose it is at present most frequently employed, along with wax or calcined magnesia; and to this we must add another circumstance, namely, that the liquid balsam usually produces a clouded mixture with pure alcohol, and thus, according to the rule laid down in the Pharmacopœia, which usually requires complete solution in this liquid, it has been declared impure.

The complaints of the druggists have been sufficiently numerous and well-founded to render it necessary once more to examine the action of alcohol on the liquid balsam.

Comparative analysis has shown a difference of from 32 to 54 per cent. in the proportions of the essential oil, and looking at it in this light, if the fluidity only depends on this circumstance, the liquid balsam may be considered as more active than that which is thickened.

If we except the trial by prolonged ebullition, or by the evaporation of the suspected balsam, in which case the brittle resin that remains is the only certain proof of the absence of a mixture of the fat castor oil, any other isolated trial by reaction is seldom sufficient for a preliminary proof. So that how good soever the plan of agitating it with a solution of caustic alkali may be, the age of the balsam and the amount of agitation contribute to the more or less rapid and complete separation of the transparent soap. Small variations, which occur in the case of the thick balsam, particularly, may easily be the cause of mistakes as to the purity of the balsam. But the action of alcohol is also insufficient, because it gives no proof of the presence of castor oil, and small quantities of fat oils may even escape detection.

In addition to this, a great variety of samples of balsam of copaiba introduced into the market (not all) also produce a clouded mixture with pure alcohol, without our being able to consider them as impure. Still there is always this difference between this effect and that produced by fat oils; in this case the mixture, which first becomes rather milky, by agitating it, immediately allows the separation of light flakes, which at first float on the surface and afterwards are deposited at the bottom of the vessel, becoming hard by degrees, but still in small quantity, in comparison with the balsam examined; after their separation by filtration, and being well washed with alcohol, they remain, under the form of a white, dry, and very brittle substance.

It is insoluble both in hot and cold alcohol, ether, and water, but it is readily and completely dissolved in petrolium. It easily melts when heated, and forms a yellowish-white resinous mass, which, on the application of more heat in a platinum spoon, becomes brown and burns, giving out a smell of caoutchouc and a clear flame, and leaving no residue. This substance, therefore, comports itself like a peculiar kind of resin, resembling that portion of mastic which is insoluble in alcohol, and it may be considered as an accidental principle in the new balsam; because all new balsams do not contain it, as I have satisfied myself by the examination of different samples brought directly to this city from Para and other countries by the *New York.* Out of three of these samples which were equally fluid, two had the pale yellow colour of balsam, but the third was considerably browner, like dark-coloured Xeres wine. All three were perfectly clear and had a strong smell, leaving, after boiling, from 40 to 42 per cent. of a dry resin. Mixed with two parts of a solution of caustic alkali, all three specimens, after frequent and strong agitation, separated a transparent soap. The brown sample gave, in pure alcohol-a perfectly transparent solution, without the least cloudiness. The two others, on the contrary, separated whitish flakes of a resinous nature; like that noticed above, their quantity was small, but tolerably equal.

If we seek the cause of this difference in their comportment, the explanation appears easy, by considering the age and state of vegetation of the plant. The multiplicity of species of the trees that yield copaiba may also cause a difference. In all cases where a cloudiness of this nature is produced by alcohol, particularly when the balsam is new and fluid, it cannot be considered as caused by adulteration; so also the results to be required from a trial by pure alcohol (which on the other hand easily demonstrates the presence of fat oils and consequently ought not to be completely abandoned) ought to be modified in the following manner:—By intimate mixture with this liquid a deposit of a fluid fat oil ought not to be quickly formed, while a light flocculous cloud ought not to induce you to reject the yellow balsam, after it has in other respects exhibited a normal state, free from adulteration.—*Chem. from Journ. de Pharmacie.*

ART. LXVIII.—ON THE RED COLOUR OF THE PROTOSALTS OF MANGANESE. By A. Völker.

Many chemists have ascribed the red colour of the protosalts of manganese to the presence of a higher oxide, and have described various methods for removing it. Thus Trommherz and Brandes advise precipitating a tolerably strong solution of a rose-coloured protosulphate of manganese by carbonate of potash, dissolving the washed protocarbonate in sulphuric acid, precipitating it again, and repeating this operation until a colourless solution is obtained. On each solution in sulphuric acid a portion of the intermixed higher oxide is said to be converted into protoxide and oxygen, and finally to disappear entirely. Since the protocarbonate, on washing in the air, is readily oxidized higher, it is evident that the frequent precipitation is more injurious than advantageous. I shall subsequently show that, by one solution of the protocarbonate of manganese in sulphuric acid, the so-called colourless salt is obtained, when a sufficient quantity of concentrated sulphuric acid has been employed.

According to Brandes, the colourless salt is obtained when the pulverized sulphate is boiled in spirit or æther, and then dissolved in water, or when its solution is boiled with some sugar. According to Brandenburg, the colourless salt is obtained on heating to redness manganese with English oil of vitriol, and the red salt with fuming oil of vitriol. Gmelin, on the contrary, always obtained a coloured salt by igniting manganese with fuming or monohydrated sulphuric acid, which, on being heated to redness and again dissolved, afforded a red solution, which could not be decolourized by sulphurous acid or continued boiling with sugar, even on the addition of sulphuric acid. He thence concludes that the red colour of the protosalts of manganese cannot be ascribed to the presence of a higher oxide. Berzelius entertained the same view, and supposes the difference of colour to depend on isomerism.

I have repeated all the above experiments, but without succeeding in obtaining a perfectly colourless salt. When protocarbonate of manganese, which has been washed and exposed to the air, is heated with dilute sulphuric acid, a very red solution is obtained, while a brown powder remains undissolved; when, on the other hand, concentrated sulphuric acid is employed, a colourless solution is obtained, which on cooling solidifies to a tissue of colourless crystals. It being known that salts of manganese are very readily more highly oxidized in the presence of a superoxide and free dilute acid, as for instance peroxide of lead and dilute nitric acid, I assured myself that the red solution obtained by dissolving protocarbonate of manganese in dilute sulphuric acid, owes its red colour to an admixture of a higher oxide of manganese, for it is instantly decolorized by a few drops of sulphurous acid or an organic substance. It appeared to me beyond all doubt that the red colour was to be ascribed to a higher oxide, and that protoxide of manganese, perfectly free from oxide, yielded colourless salts; but in preparing a larger quantity of the colourless salt, by dissolving pure protocarbonate of manganese, I obtained crystals which singly appeared colourless, but in mass exhibited a decided, though faint reddish tint. This slight colour could not be removed either by sulphurous acid, organic substances or sulphuretted hydrogen; it could therefore not be ascribed to the presence of a higher oxide. The protocarbonate of manganese had been prepared with care, and tested as to its purity previous to solution in sulphuric acid; the slight reddish tint could therefore not be owing to any foreign substance. I am inclined to regard this faint colouring which the protosalts of manganese exhibit, and which cannot be removed by sulphurous acid, sulphuretted hydrogen, or any other reducing agent, as peculiar to the protosalts of manganese.

The most usual cause however of the red colour of the protosalts of manganese, is owing to the presence of cobalt. In preparing the colourless salt, by treating commercial manganese with an excess of concentrated sulphuric acid, I obtained on dissolving the salt a solution, which even when largely diluted had a rose-red colour, which could not be made to disappear by sulphurous acid, or any other reducing agent. I was long in doubt respecting this red colour, but some experiments soon showed me that it arose from cobalt; and in fact nearly all the kinds of manganese which I have examined, from the most different localities, contained more or less cobalt, some in such large quantity that it might be advantageous to obtain cobalt from them for technical purposes. I likewise found cobalt constantly present in all the red coloured salts of manganese, and the more of it the deeper they were coloured. This explains why the so-called colourless salt is obtained by heating the protosulphate of manganese to redness, since the sulphate of cobalt is readily decomposed at a red heat; it further explains why some persons have obtained colourless crystals from coloured solutions by the application of reducing substances, while others obtained coloured salts; the latter had probably employed material containing cobalt.

The separation of cobalt from manganese is readily effected in the following simple manner: Sulphuret of ammonium, diluted with water, is carefully added in drops to the somewhat dilute solution of the salt of manganese containing cobalt, agitating constantly as long as a black precipitate is produced. The cobalt is thus completely precipitated; what first falls contains not a trace of manganese; but to be sure of removing the whole of the cobalt, it is advisable to throw down a little of the manganese with a slight excess of sulphuret of ammonium.

I am not able to confirm the statement met with in some works, that colourless salts of manganese are precipitated of a white colour by sulphuret of ammonium; at least I always obtained the characteristic flesh-coloured precipitate. The cause of this statement is undoubtedly to be ascribed to the bad nature of the sulphuret of ammonium. Sulphuret of ammonium which has been kept for a long time, and contains, owing to the frequent opening of the bottle, much carbonate of ammonia, precipitates protoxide of manganese from dilute solutions of a white colour. With ferrocyanide of potassium I obtained a white precipitate, which experienced no change even after long keeping, while the precipitate produced by ferrocyanide of potassium in the red coloured salt containing cobalt, appeared after some time reddish-brown.

With respect to a method which has been proposed for separating quantitatively manganese from cobalt, I will cursorily observe that protochloride of manganese, according to my observation, is perceptibly volatilized when heated in a current of hydrogen gas. The hydrogen acquires the property of burning with a white luminous flame, which deposits brown stains of oxide of manganese on a cold piece of porcelain. Water through which the gas was passed gave distinct traces of protochloride of manganese. The salt could not have been carried over mechanically, as it was used in the fused state. I have moreover obtained the protochloride of manganese sublimed in colourless, extremely light laminæ; the heat required, however, is very great.—*Chem. Gaz., from Liebig's Annalen.*

ART. LXIX.—ON THE ACTION OF FERROCYANIDE OF POTASSIUM ON THE TARTRATE AND CITRATE OF IRON; AND OF TARTARIC ACID SIMULTANEOUSLY WITH AMMONIA, ON PRUSSIAN BLUE.

By M. Ch. Calloud.

The ferrocyanide of potassium, of which the action on all the salts of iron with mineral acids is so well known and so well characterized, presents, in its contact with some salts of iron with organic acids, differences of action which are modified according to the state of neutrality of these salts, in giving products which do not appear to be isomeric with those of the inorganic iron salts. In examining the action of the ferrocyanide of iron on the tartrate and citrate of iron, some remarkable reactions are observable which are not common to all the salts of iron, and which, as far as I know, have not been previously mentioned.

The neutral tartrate of iron, and the neutral citrate, are precipitated by the alkaline ferrocyanides, as all others of the per salts of iron, but the precipitate formed has not all the appearances of ordinary prussian blue, and its colour is often very much modified, without arising from an excess of one of the reacting salts.

The tartrate of iron with excess of tartaric acid, on the contrary, is not precipitated by a solution of ferrocyanide of potassium, and the *solution* becomes immediately *blue* and remains limpid. After the lapse of a long time, a slight precipitate occurs, which is not so dense as prussian blue; the liquid remaining meanwhile *clear* and *blue*.

This *blue* liquid, obtained by mixing the solution of tartrate of iron with *excess of tartaric acid* and the ferrocyanide, when evaporated to dryness, does not change its properties; it is concentrated by heat without decomposing, the product of the evaporation remains a beautiful *deep blue* and redissolves in water.

Ammonia *destroys* the blue colour of the above reaction. This decoloration, effected by ammonia on the *soluble blue*, (of the acid tartrate of iron and ferrocyanide) is explained by the immediate formation of the double tartrate of iron and ammonia, which, as we already know, for the other double tartrate of iron and the alkalies is without action on the double cyanide of iron and potassium.

The citrate of the peroxide of iron with excess of citric acid, and the ferrocyanide of potassium, form a *soluble blue*, equally decomposable by ammonia.

I have not essayed the action of the ferrocyanide of potassium, except on these two salts; but it is probable that it applies equally to all the salts of peroxide of iron with organic acids.

Prussian blue precipitated from a salt of the peroxide of iron, (as sulphate, nitrate, or chloride,) is not dissolved by tartaric acid only, and is not at all modified; but on adding ammonia afterwards, the *blue* becomes white, presenting the intermediate phases of coloration according to the quantity of ammonia added. Thus it becomes *violet-purple, amethyst, rose, pale rose,* and then *white*. This *white precipitate* becomes blue by the addition of a new quantity of tartaric acid, and returns to *white* by ammonia. Exposed to the air and under water, it remains white, but becomes again *blue* by drying.

The interesting point of this reaction is, that it is altogether according as you throw on the prussian blue, a ready made solution of tartrate of ammonia, or tartaric acid, and then ammonia afterwards. In the first case, the prussian blue is dissolved, and the solution has a magnificent *violet* colour; in the second, the precipitated prussian blue does not dissolve, and the *blue* becomes immediately *white*.

The vegetable salt also modifies the prussian blue, but it does not totally change the colour even when employed in excess.

The property enjoyed by tartrate of ammonia of dissolving prussian blue, was first announced by M. Monthiers. This fact I had already personally ascertained, and of which I had taken a note, proposing to myself to examine it at my leisure.—*Journ. de Pharm. et de Chim.*

ART. LXX.—ON THE EMPLOYMENT OF CHLORINE, AND HYDROCHLORIC AND SULPHURIC ACIDS, FOR THE PRESERVATION OF LEECHES.

M. **Roder**, pharmacien at Lenzburg, had seen a great number of leeches perish in the course of the year 1845, by an epidemic; all the means of preservation known, such as charcoal, honey, sugar, etc., having failed. He had then recourse to chlorine; to 48 ounces of water he added three, four, five drops or more, of solution of chlorine; put the leeches in it, and left them for ten or fifteen minutes, when the chlorine water was replaced by pure water; this treatment saved the leeches without the necessity of renewing it.

The same end would probably be attained by the addition of some drops of hydrochloric acid to neutralize the ammonia which has been developed, and which is, as every one knows, a dangerous poison for leeches; in fact, they were preserved very well in water acidulated by earthy turf, which contains a small quantity of crenic acid, and perhaps acetic acid. The employment of ordinary sulphuric acid, very diluted, (five or six drops to twelve ounces of water,) has equally proved beneficial in another case of the epidemic of leeches. The acidulated water was replaced by pure water, and every trace of the disease disappeared completely. *Journ. de Pharm. et de Chim.*

EXTRACT FROM THE MINUTES OF THE BOARD OF TRUSTEES.

At a stated meeting of the Board of Trustees of the Philadelphia College of Pharmacy, held 12th month 21st, 1846, the chairman announced the death of A. J. L. Duhamel, a member of this Board, who died of a pulmonary disease, this morning at about 6 o'clock, in the 33rd year of his age

The following minute, which was prepared by the Secretary on the occasion, was approved, and ordered to be recorded.

The Board of Trustees having been called to mourn the death of their late esteemed fellow member, Augustine J. L Duhamel, have regarded an expression of their sorrow on the occasion, and their respect for his memory, as called for at their hands.

He became a graduate of our College in 1834, and a member in 1840, and during the last five years has been one of the most zealous and useful members of this Board His talent for scientific research, and thorough acquaintance with Pharmacy and its kindred sciences, have been exhibited in numerous contributions to the American Journal of Pharmacy, and in the discussions of our pharmaceutical meetings.

Though possessed of a retiring disposition, his talents were not the less appreciated by his associates, and he was not without frequent evidences of their confidence and regard. His early death has terminated a career of usefulness and honour, and thrown over his survivors in this Board a feeling of unfeigned sorrow. He will long be remembered by them as an accomplished apothecary, and an amiable and esteemed associate in their labours.

Extracted from the minutes.

EDWARD PARRISH, *Secretary.*

NECROLOGY.

American Pharmacy has lost an able and experienced advocate in the person of Augustine J. L. Duhamel, who departed this life on the 21st ultimo, in the thirty third year of his age; and we, who were acquainted with him, and amongst whom he has grown up, have especially to mourn the loss of a valuable member of our profession, and a worthy fellow-citizen, thus cut off at the height of his career, when the rewards of a steady pursuit of professional duty were commencing to flow in upon him, and the prospects of the future were opening favourably on his path.

A. J. L. Duhamel was born in this city, though of French descent; his father, who survives him, being a native of Bayonne in France.

In the year 1829, he commenced the study of pharmacy with Elias Durand, under whose guidance he attained to that proficiency in pharmaceutical knowledge and practice, which marked him as a professional man; and in the employ of his preceptor he devoted ten years of his majority.

In the spring of 1834, after accomplishing the courses of study prescribed by the Philadelphia College of Pharmacy, he applied for and received the diploma of that Institution, which declared him to be a Graduate in Pharmacy. From that period almost to his decease, the continued interest felt by him in his favourite pursuit, has been deeply graven on the pages of this Journal, in the numerous contributions to its volumes which owe their origin to his pen. In this field his loss will be sensibly experienced, by the cessation of of his labours as a contributor.

His papers number thirty four in all, scattered through twelve volumes of the Journal, and are eminently practical in their character. His inaugural essay on the preparations of iodine, published in 1835, extended through seventeen pages, and contained much that was new and interesting at that period.

Seven of his essays, under the title of "Pharmaceutical Notices" exhibit a great variety of facts, chiefly relative to new formulæ, or suggestions for the improvement of old ones; and perhaps no portion of his investigations were more acceptable to his brethren, or marked with more benefit to the profession, than this series of unpretending communications.

Two of his contributions relate to Boullay's filter, and method of displacement, and we believe that he was the first on this side of the Atlantic to comment on this valuable improvement in pharmaceutical manipulation.

His other papers embrace a variety of subjects, generally having a practical tendency, often original, though frequently composed of commentations on the labours of French writers, with the language of which he was familiar; an accomplishment that enabled him on very many occasions to lend his aid in the way of translations.

In 1840 he became a member of the Philadelphia College of Pharmacy, and shortly afterwards was chosen by the committee of the College, then engaged in revising the Pharmacopœia, as one of their three assistants, which duty he performed in a creditable manner. About this period he was elected a member of the Board of Trustees, of which body he continued a member until his death.

The character of his mind, though not marked with striking originality, was particularly well suited for his profession; and in viewing subjects he was influenced more by the practical and useful, than by any abstract scientific interest they might possess. His acquaintance with English literature and general history was of no mean extent, and his familiarity with the French language gave him access to the writers of that country, of which he extensively availed himself.

His mild and courteous demeanour marked him as a gentleman, and in his intercourse with society the impressions left on the minds of his associates, were altogether in favour of the goodness of his heart. May we who are left emulate his virtues, and endeavour by increased industry to fill up the professional hiatus occasioned by his early and lamented death.

W. P. Jr.

MISCELLANY.

On the Employment of Guaiacum-resin as a test. By G. Osann.—According to Schönbein, guaiacum-resin is coloured blue by ozone; the same alteration is also effected by chlorine. This circumstance can be turned to account for detecting very feeble electric currents, by passing them through a mixture of a few drops of tincture of guaiacum and common salt. The guaiacum solution, however, should always be recently prepared.

The solution of guaiacum is extremely sensitive towards perchloride of iron, so that when present in so small a proportion as not to act upon tincture of galls, it still colours the solution of guaiacum blue.—*Chem. Gaz. from Poggendorff's Annalen.*

A new mode of preserving Animal Substances. By the Abbe Baldaumik.—The Abbé Baldaumik, preparator at the Museum of Natural History at Vienna, has succeeded in rendering animal substances as hard as stone. To effect this he immerses them in water, holding in solution bichloride of mercury and hydrochlorate of ammonia. Substances that have remained immersed in this liquid for some time acquire the hardness of stone, may be polished, resist the hammer, have an angular fracture, and give out a metallic sound when struck. They preserve their natural colour, and require no further care after they are taken out of the bath.—*Chemist, from Archiv. de Pharm.*

On the Preservation of Water. By M. Perinet.—M. Perinet, ex-professor of the *Hopital Militaire d'Instruction*, has succeeded in preserving water in a sweet state by placing a kilogramme and a half of black oxide of manganese in each cask of water containing 250 litres. He has kept this water for seven years in the same barrels, and exposed them to various temperatures; at the end of that time he found it as limpid, free from smell, and of as good quality as at the beginning of the experiment.—*Ibid, from Journ. de Chim.*

Mode of dividing Plates of Zinc. By M. Waidele.—It is frequently a subject of great difficulty to divide plates of cast zinc for use in galvanic batteries. The following is a simple and ready method of accomplishing this end. Grease the plate over by means of a rag and a little tallow; with a pointed instrument draw a line in the required direction of the cut, so as to remove the grease from that spot, and penetrate slightly into the metal; pass a little dilute sulphuric acid over this line by means of a feather, and then let a drop or two of mercury fall on the same spot; the zinc soon becomes amalgamated in the direction of the line, and through its entire thickness. A slight blow, properly given, will cause it to break.—*Chem. Gaz. from Revue Scient.*

Preparation of Ferridcyanide of Potassium. By Dr. Riegel.—It has recently been recommended, in order to prevent the formation of the well-known yellowish-green body in the preparation of the red prussiate of potash, to pass the chlorine obtained from 50 grms. salt with manganese and sulphuric acid into a solution of 50 grms. of the yellow ferrocyanide in 200 grms. water. The author could not obtain any satisfactory result by this method; he therefore recommends, when the formation of the body cannot be avoided, to allow the liquid to evaporate in a very tall vessel, when the green body is constantly deposited at the bottom of the vessel, and can readily be removed mechanically by repeated recrystallization.—*Ibid, from Jahrb. für Prakt. Pharm.*

Manufacture of Lucifer-Matches without Sulphur. By R. Böttger.—The author recommends the following composition for the preparation of lucifer matches:—4 parts phosphorus, 10 parts nitre, 6 parts gelatine, 5 parts red lead or ochre, and 2 parts smalt. The gelatine is soaked in a small quantity of water for 24 hours, the jelly conveyed into a mortar and warmed until it has melted, when the other ingredients are introduced, constantly applying heat, but not above 167°, until the whole forms a perfectly homogeneous mass, which cannot be drawn out into threads. To make lucifer-matches with this mass, which continue to burn after ignition, without any coating of sulphur, the extremities of the matches are held for a few seconds against a plate of iron, in order to carbonize them superficially; they are then dipped into very hot melted wax, the excess shaken off with a jerk of the arm, and dipped into the above composition.—*Ibid, from Phys. und Chem. Vorlesung.*

Artificial Marble.—M. Bouisson has taken out a patent for preparing artificial marble from gypsum, which is to be cut of the required size, placed in a metallic trough in a furnace, and kept at the temperature of 90° for some time, after which a solution of alum in boiling water is poured upon it, and a gentle heat continued for some length of time, the water being renewed as it evaporates. For a block 6 feet long and 2 feet in the other directions, exposure for 5 hours before the addition of alum solution, and 72 hours after, suffices to impregnate the plaster. The strength of the alum solution is 1 lb. to 6 quarts of water. It is always well to cut the plaster in the form required before hardening it. By introducing colouring matter into the solution various tints may be obtained.—*Ibid, from Journ. de Chem. Med.*

On the Action of Oxalic Acid upon the Blood and Dead Tissues of the Animal Body. By DR. LETHEBY.—It has been stated by Dr. Coindet, Dr. Christison and others, that oxalic acid does not appear to have any corrosive action on the stomach like the mineral acids. Dr. Letheby, however, remarks that these statements are opposed to the observations which he has made. In every case which he had examined of poisoning by oxalic acid, the stomach after death was found to be so completely corroded that it would not hold together. Numerous experiments were made with various animal tissues, such as submitting skin, stomach, intestine, muscle and tendon to the action of oxalic acid of different strengths. After standing about 12 or 14 hours at a temperature of 60° F., it was found that the cellular and mucous tissue of each underwent either complete solution, or else was so softened that it broke down under the pressure of the thumb and fingers; the albuminous and muscular tissues were also softened, and looked as if they had been scalded. The solutions were then filtered and evaporated in a water-bath; by which means a gelatinous-looking mass was obtained, and the oxalic acid had so entered into combination with the gelatine that it could not be dissolved out in its usual manner by the action of cold alcohol.—*Chem. Gaz.*

On the Preparation of Caustic Baryta. By DR. E. RIEGEL.—The reduction of the carbonate of baryta with one-tenth charcoal and some tragacanth-mucilage, yields a baryta which constantly contains some charcoal, and most frequently also undecomposed carbonate of baryta. It may be obtained more pure by heating to redness the nitrate in a porcelain crucible; but then the heat must be long applied, which renders the preparation rather expensive. According to Vogel, a fourth part in weight of concentrated solution of caustic potash is added to a boiling concentrated solution of sulphuret of barium, when the hydrate separates on cooling in crystals, which may be purified by recrystallization. Hydrate of baryta may be obtained quicker, but less pure, by decomposing a solution of sulphuret of barium with oxide of copper; the ley generally contains a slight trace of copper.

A very simple and cheap method consists in heating a concentrated solution of sulphuret of barium with a sufficient quantity of peroxide of manganese, until reagents indicate no sulphuretted hydrogen in the liquid, and then filtering as quickly as possible. On the cooling of the hot concentrated solution, the hydrate of baryta separates in colourless, transparent, four-sided, and flattened six-sided columns, with four terminal surfaces, and the filtered ley may be used as barytic water. The author could not observe the formation of any hyposulphite of baryta. On adding a few drops of basic acetate of lead to the solution of sulphuret of barium, which had been heated with sufficient peroxide of manganese, a beautiful brick-red precipitate was formed, which however was not examined, and in subsequent experiments could not be again obtained.—*Ibid, from Jahrb. für Prakt. Chem.*

Purification of Hippuric Acid. By DR. A. BENSCH.—The fresh urine of the horse, that passed in the morning being best, is evaporated in a water-bath to one-eighth of its volume, precipitated when cold with muriatic acid, the hippuric acid collected on a strainer, strongly pressed, and treated with 10 times its weight of boiling water and excess of milk of lime. The mixture is strained, pressed, and the fluid treated with solution of alum until the alkaline reaction has disappeared; it is then allowed to cool to 104° F., and solution of bicarbonate of soda added as long as a precipitate ensues, strained and pressed, and the clear fluid precipitated with muriatic acid. The precipitated hippuric acid, after having been washed and pressed, is dissolved in boiling water, an ounce of animal charcoal added to each pound of moist hippuric acid, the boiling liquid filtered through paper, and perfectly white hippuric acid is thus obtained. The precipitates produced are readily separable from the liquid by a linen cloth, not passing through the latter when pressed; hence the purification may be accomplished in a few hours, provided the temperature, when the bicarbonate of soda is added, does not exceed 104° F.—*Ibid, from Liebig's Annalen.*

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